Graduate Studies Bulletin 1980–1981

University of Massachusetts at Boston

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University of Massachusetts at Boston

- Harbor Campus
- Downtown Center

The purpose of this bulletin is to provide academic and non-academic information about the University of Massachusetts at Boston to persons who work and study here, to persons who may be interested in applying for admission, and to parents, teachers, counselors and the general public. THIS BULLETIN IS NOT A CONTRACT OR AN OFFER TO MAKE A CONTRACT. While every effort has been made to ensure the accuracy of the information in this bulletin, the University reserves the right to make changes at any time with respect to course offerings, degree requirements, services provided or any other subject addressed in this bulletin. The information in this bulletin is provided solely for the convenience of the reader, and the University expressly disclaims any liability which may be otherwise incurred.

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The University of Massachusetts at Boston does not discriminate against students, faculty, staff, or applicants for employment because of sex, ethnic background, race, age, religion, or handicap. The University of Massachusetts at Boston is also fully cognizant of its responsibilities under Title IX of the Higher Education Amendments of 1972, of Titles VI and VII of the Civil Rights Act, of § 503 and 504 of the Rehabilitation Act of 1973, and the Equal Pay Act.

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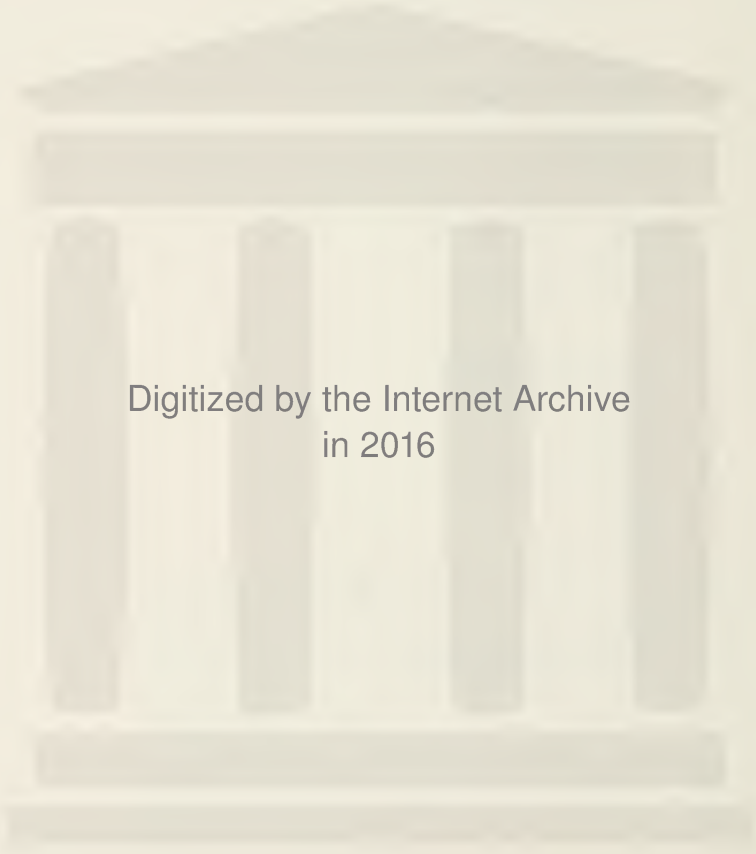
Harbor Campus Map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FOREWORD

The University of Massachusetts is the state university of the Commonwealth. It was founded in 1863 under provisions of the Morrill Land Grant Act passed by the United States Congress one year earlier. The University of Massachusetts has three campuses at Amherst, at Boston, and at Worcester.

Situated on a finger of land jutting into the picturesque aquatic environment of Dorchester Bay and Old Harbor, the main or Harbor Campus of the University of Massachusetts at Boston is easily accessible by public transportation and private automobile. A campus shuttle bus links the Harbor Campus with its Downtown Center, at 100 Arlington Street in Park Square which is also easily accessible by public transportation. Another campus shuttle bus links the Harbor Campus with the Columbia Red Line transit station. The Harbor Campus consists of seven buildings on approximately 100 acres of land surrounded on three sides by ever-changing seascapes and abutting the John F. Kennedy Memorial Library. Physical growth of the campus has been carefully planned with provisions to meet future needs of the citizens of the Commonwealth.

The University of Massachusetts at Boston was founded in 1965 to provide the opportunity for a superior undergraduate and graduate education at moderate cost to the people of the Commonwealth and particularly of the greater Boston area. Since its founding a deep commitment has been demonstrated to serving students and the community. The urban setting permits the University of Massachusetts at Boston to offer a broad array of resources — educational, professional, and cultural — unique in American higher education. These resources, in conjunction with an outstanding commitment to the student's individual development, enable the student to earn an excellent education.

Life at the University of Massachusetts at Boston is as rich and varied as the City of Boston itself. As a student in Boston one can easily visit world-famous museums, theaters and concert sites, or enjoy a cruise to the islands of Boston Harbor. As a student on campus, one can readily attend plays, musical recitals and films, use outstanding specimen collections and facilities for research, navigate one of our sailboats in Dorchester Bay, or conduct research on the islands of the harbor and at our Nantucket field station. The access and opportunity offered by the University of Massachusetts at Boston is mirrored by the access and opportunity of Boston and New England.

The Associate Provost for Graduate Studies, in collaboration with the Graduate Council at the University of Massachusetts at Boston, exercises overall review and supervision of graduate programs and provides guidance in the development of new programs as well as the maintenance of standards for existing programs. Each college — the College of Arts and Sciences, the College of Management and Professional Studies, and the College of Public and Community Service — cooperatively supports graduate education in accordance with the highest national professional standards.

As part of its commitment to serving the citizens of the Commonwealth, the University of Massachusetts at Boston offers graduate studies at the master's level in Biology, Chemistry, Critical and Creative Thinking, English, History, Mathematics, and Applied Physics. Special tracks in these programs include History-Archival Methods, History-Historical Archeology, and Biology-Applied Marine Ecology.

ACADEMIC CALENDAR 1980–1981

Fall Semester

Add/Drop Day	August 29	Friday
Labor Day (Holiday)	September 1	Monday
Classes Begin	September 2	Tuesday
Add/Drop Ends	September 9	Tuesday
Columbus Day (Holiday)	October 13	Monday
Mid Semester	October 21	Tuesday
Pass/Fail Deadline	October 21	Tuesday
Course Withdrawal Deadline	November 4	Tuesday
Veterans' Day (Holiday)	November 11	Tuesday
Advance Registration	Nov. 24 - Dec. 5	Mon - Fri
Thanksgiving Recess	November 27 - 30	Thurs - Sun
Classes Resume	December 1	Monday
Classes End	December 10	Wednesday
Reading Period	December 11 - 16	Thurs - Tues
Final Exams Begin	December 17	Wednesday
Final Exams End	December 23	Tuesday
Emergency Snow Day	December 24	Wednesday

Spring Semester

Add/Drop Day	January 16	Friday
Classes Begin	January 19	Monday
Add/Drop Ends	January 23	Friday
Washington's Birthday (Holiday)	February 16	Monday
Monday Schedule	February 17	Tuesday
Mid Semester	March 12	Thursday
Pass/Fail Deadline	March 12	Thursday
Spring Vacation	March 14 - 22	Sat - Sun
Classes Resume	March 23	Monday
Course Withdrawal Deadline	April 2	Thursday
Patriot's Day (Holiday)	April 20	Monday
Advance Registration	April 13 - 24	Mon - Fri
Classes End	May 5	Tuesday
Reading Period	May 6 - 10	Wed - Sun
Final Exams Begin	May 11	Monday
Final Exams End	May 15	Friday
Commencement	May 31	Sunday

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ADMISSION

All graduates of approved colleges, universities, or institutions who hold the BA or BS or other bachelor's degrees are eligible to apply for admission to Graduate Studies. Admission is only for the semester requested and cannot be guaranteed for a later date. Application forms can be obtained by writing to the Dean of Admissions, University of Massachusetts at Boston, Harbor Campus, Boston, MA 02125. Application for admission, with supporting documents, should be sent in duplicate to the Office of the Dean of Admissions. The application and the accompanying documents must be received by April 15 for September enrollment, and November 15 for the January enrollment. Applications received after these dates can be considered only on a space available basis.

Admission to Graduate Studies does not automatically indicate candidacy for an advanced degree. Such candidacy is subject to specific requirements as defined by the individual graduate programs. Students must secure the approval of the Graduate Program Director of the program in which they desire to major before they can become a candidate for a degree in that subject.

Applicants can be admitted to Graduate Studies in one of the two following categories:

- Degree Status: a student admitted as fully qualified to undertake a program toward a graduate degree.
- Special Graduate Student: any student who is not admitted to a graduate program who is allowed to enroll in courses.

General Admission Requirements

1. A minimum cumulative grade point average of 2.75.
2. A bachelor's degree or the equivalent from any college or university of recognized standing.
3. Two official transcripts of all previous college work (graduate and undergraduate).

   An applicant should request the registrar of all colleges previously attended to send two copies of the transcript directly to the Office of the Dean of Admissions. A final transcript showing that the bachelor's degree has been awarded must be received before the applicant can enter Graduate Studies.
4. Three letters of recommendation from persons in the field of the applicant's academic major at the institution most recently attended. Applicants whose academic record goes back further than five years may substitute other references, subject to the graduate program acceptance.
5. The Graduate Record Examination (both Aptitude and Advanced Tests) are not required in all programs but the scores should be submitted if available. The Biology and Chemistry programs require appropriate GRE exams. Addresses of the Graduate Record Exam test centers are available from the Educational Testing Service, 20 Nassau St., Princeton, New Jersey 08540.
6. For foreign student requirements, see section entitled **Foreign Applicants.**
7. The applicant must be accepted by both the graduate programs and the Associate Provost for Graduate Studies.

Foreign Applicants

The test of English as a Foreign Language (TOEFL) is required of all applicants for admission to Graduate Studies from countries whose native language is not English. Information about the examination may be obtained by writing:

- Test of English as a Foreign Language, Educational Testing Service, Princeton, New Jersey 08540.

TOEFL may be waived if the applicant has attended an English speaking college or university for a period of at least two academic years. In all other cases a score of 550 or above is required. Students scoring between 500 and 549, who otherwise meet the requirements set by graduate programs, may be admitted with special permission of the graduate program in which they plan to major.

Readmission

A student or applicant who falls into one of these categories must reapply:

1. An applicant who has previously been admitted to the University of Massachusetts at Boston but did not enroll on the entrance date stated in the acceptance letter.
2. A graduate student at this University who was accepted for one degree program and wishes to apply for another program or degree.
3. A degree candidate who has not enrolled in courses or paid the program fee must reapply and pay all associated fees.

TUITION AND FEES

The financial requirements of the University, changing costs, state and legislative action, and other matters may require an adjustment of these charges and expenses. The University reserves the right to make adjustments to the estimated charges and expenses as may from time to time be necessary in the opinion of the Board of Trustees. The applicant acknowledges this reservation by the submission of an application for admission or by registration.

Entrance Expenses

Application Fee: Each application for admission to the University must be accompanied by a non-refundable application fee payment of $10.00 for qualified Massachusetts residents; $25.00 for non-Massachusetts residents. Checks should be made payable to the *University of Massachusetts, Boston.*

Student Expenses

Graduate Fees Half Rate

8 credits or less

Tuition — Out-of-State	per credit	$137.50
In-State	per credit	47.50
Activities		9.00
Health		13.50
Athletic		2.50
I.D.		1.00
Medical Insurance		70.00*
PIRG		2.00*

*Optional
All amounts are subject to change.

Graduate Fees Full Rate

9 credits or more

Tuition — Out-of-State	per credit	$137.50**
In-State	per credit	47.50***
Activities		18.00
Health		27.00
Athletic		5.00
I.D.		1.00
Medical Insurance		70.00*
PIRG		2.00*

*Optional
**Maximum tuition is $1375 per semester.
***Maximum tuition is $475 per semester.
All amounts are subject to change.

Cost of Attendance

The cost of attending UMass/Boston's Graduate Studies Program may be compared to any general budget familiar to most people, like a household or personal budget. Within that budget are a number of factors which may change from time to time due to rising labor costs, changes in the costs of goods and services, and other influences.

The sample budget below is an approximate estimate of the cost of attendance, and is used by the University when considering individual applications for financial aid.

Institutional Budget-Graduate Students

Expenses (Annual)	Dependent (9 Mos. Duration) (Tax Exemption of Parents)**	Independent (12 Mos. Duration)
*Tuition	$ 475.00	$ 475.00
Activity Fee	36.00	36.00
Athletic Fee	10.00	10.00
I.D. Card	1.00	1.00
Health Fee	54.00	54.00
Mass PIRG (optional)	4.00	4.00
Medical Insurance (optional)	70.00	70.00
Room & Board Allowance	1,400.00	3,200.00
Books and Supplies	250.00	250.00
Personal Expense Allowance	450.00	720.00
Transportation Allowance	400.00	550.00
TOTAL	$3,150.00	$5,370.00

*Out-of-State Tuition is $1,375.00.
**$900.00 for each legal dependent.

Explanation of Fees and Payments

In-State Tuition

As a state institution, the University of Massachusetts at Boston offers a low rate of tuition to all students entering from the Commonwealth. Eligiblity for admission under the low residential rate is determined in accordance with the policy established by the Board of Trustees and detailed under the section titled 'Residence Status'.

Student Activities Fee

This is a mandatory fee set by the Board of Trustees. It is used to support programs and activities beneficial to students, such as the recognized student organizations and the University Cultural Events Committee.

Student Health Fee

This is a mandatory fee for all students set by the Board of Trustees used to support the University Health Service and its programs.

Medical/Surgical Insurance

An optional insurance plan is available to students which provides coverage for health, medical and surgical care on a twelve month basis for injuries or illness during the school year, holidays, and summer vacation. Students who register for the fall semester have only one opportunity to enter this program each year, at the time of payment of the fall semester bill. It is also offered on the spring semester bill for new spring registrants only. Dependents of married students are not covered under this plan. Coverage for dependents is available at additional cost.

Commencement Fee

A commencement fee of $15.00 is assessed students in the fall semester of their commencement year, as commencement exercises and events are intended to be self-supporting.

Payment Due Dates

In accordance with University policy all charges for tuition and fees are due and payable approximately 21 days prior to the date of final registration for each semester. Bills will be rendered in advance with due date shown and should be returned with the proper payment to the Bursar's Office, University of Massachusetts at Boston, Boston, MA 02125. Payment of bills is an integral part of registration. A student will not be fully registered until the bills are paid in full or otherwise accounted for. All tuition bills must be returned directly to the Bursar's Office for registration clearance by the due date on the bill. Delinquent accounts will be considered sufficient cause for cancellation of registration, as University regulations prohibit final registration, graduation, or granting credit for any student whose account with the University is delinquent.

Late Payment and Registration

Any student who does not make payment of his/her semester charges by the date specified will be required to pay a late payment fee of $25.00.

Tuition Fee Refunds

A student who leaves the University for any reason, except as specified below, before a semester is completed will be granted a pro rata refund of tuition and fees. Upon completion of a withdrawal form from the Office of Graduate Studies, a student who makes an advance payment and then for any reason does not attend any part of the next semester or term at the University will be given a full refund of tuition and fees. The application fee, the $15.00 admission (matriculation) payment and the $15.00 orientation payment required of new students are not refundable. A student called into military service before completion of a semester will be given a pro rata refund of tuition and fees provided that he receives no academic credit for the work of that semester. If academic credit is given, there will be no refund. A student who is suspended or expelled from the University for disciplinary reasons forfeits all rights to a refund.

Refund Schedule

Regular Term	Amount Refunded if Payed	Amount Owed by Student if Not Payed
Within the first two weeks from the beginning of semester or term	80%	20%
During the third week	60%	40%
During the fourth week	40%	60%
During the fifth week	20%	80%
After the fifth week	no refund	100%

Refunds are based upon the withdrawal date established by the Registrar.

Financial Aid

Financial Aid at the University of Massachusetts/Boston is awarded to those students who cannot provide the full cost of their education through their own and their families' reasonable efforts. The term "financial aid" is used to include scholarships, grants, long-term loans and part-time employment.

Financial need is determined by the following formula: Student and/or Family's Resources - Institutional Budget = Student's Financial Need. Award notices are sent in late spring for the Fall semester and by mid-December for the Spring semester.

The following criteria determine eligibility for financial assistance:

1. Demonstrated financial need.
2. U.S. citizen or permanent resident.
3. Massachusetts resident (tuition waivers only).
4. Matriculated for at least six credits.

Application Procedure

Students must submit the following items in order to be considered for financial assistance at UMass/Boston:

1. University Application — available in Financial Aid Office.
2. Financial Aid Form — FAF.
3. Financial Aid Transcript — Available in Financial Aid Office.
4. Notarized copy of 1040 form or some other applicable yearly income verification.

The deadline for submission of these forms is mid-March for the Fall semester and mid-November for the Spring semester. Check with the Financial Aid Office for the exact dates.

The following types of aid are administered by the Financial Aid Office at UMass/Boston. Awards are based primarily on "financial need."

National Direct Student Loan Program (NDSL)

The National Direct Student Loan Program is for students who are enrolled at least half-time in a participating postsecondary institution and who need a loan to meet their educational expenses.

You may borrow up to a total of: (a) $2,500.00 if you are enrolled in a vocational program or if you have completed less than two years of a program leading to a bachelor's degree; (b) $5,000.00 if you are an undergraduate student who has already completed two years of study toward a bachelor's degree (this total includes any amount you borrowed under NDSL for your first two years of study); (c) $10,000.00 if you are a graduate student (this total includes any amount you borrowed under NDSL for your undergraduate study).

Repayment begins nine months after you graduate or leave school for other reasons. You may be allowed up to ten years to pay back the loan. During the repayment period you will be charged 3 percent interest on the unpaid balance of the loan principle.

No payments are required for up to three years while you serve in the Armed Forces, Peace Corps, or VISTA.

The University's Financial Aid Officer can tell you about loan cancellation provisions for borrowers who enter fields of teaching, or who teach in designated schools.

College Work-Study Program (CWSP)

The purpose of the College Work-Study Program is to expand part-time employment opportunities for students, particularly those from low-income families, who are in need of the earnings from part-time employment in order to pursue their education. Federal grants are made to participating institutions to enable them to create job opportunities for their eligible students. The institution may arrange for students to work for the institution, or for public, non-profit organizations.

Guaranteed Student Loan Program (GSLP)

This program was designed to supplement existing financial resources. GSLP loans are offered through a student's home-town bank or credit union; they are available to both undergraduate and graduate students and range from $1000-$2500 per academic year. If the student meets the requirements for interest subsidy, the Federal Government will pay the interest while the student is enrolled and during the nine (9) month grace period. Subsidy eligibility is determined by the school and lender under Federal guidelines.

UMass/Boston Tuition Waiver

This program is for those students eligible under state law, who are not currently receiving or who are ineligible to receive sufficient grant/or scholarship assistance and who have already undertaken reasonable levels of self-help assistance (loans and employment earnings). Applications and more information are available from the Financial Aid Office.

Waiver of Tuition for Full-Time Community College Faculty

The Trustees of the University of Massachusetts have authorized waiver of tuition but not fees for faculty members of the Massachusetts Regional Community Colleges taking courses at the University of Massachusetts, providing the faculty members have been serving full time before taking such courses and return to full-time teaching in their Community College after completion of course work. When a faculty member who is eligible for such a tuition waiver desires to take a course at the University, his/her Community College President should write a memorandum certifying that he/she is a full-time faculty member. Such waivers will apply for the period from September 1 to the following August 31. Such faculty members must be accepted for admission by the graduate program prior to any registration.

Graduate Assistantships: Teaching and Research

The University offers graduate assistantships in the instructional and research areas of those departments which sponsor graduate programs. Stipend amounts vary with the type of work and the amount of time required. Tuition waivers are granted only to assistants who receive stipends equal to at least half the current standard annual full-time assistantship stipend and who are appointed for a period of at least one full semester. Certain fees are not waived. For futher information contact the Office of Graduate Studies or the appropriate Graduate Program Director.

Veterans

Information concerning veterans' status and payments under federal and state law is available at the Office of Veterans Affairs. Tuition may be waived for Vietnam Veterans whose service was credited to the Commonwealth.

Residence Status

These rules and regulations shall apply to the classification of students at the University of Massachusetts for tuition purposes. The residency form accompanies the University application and classification is made at the time of admission. Those not qualified or wishing appeal see Section V.

Section I. Definitions

1. **Academic period**
   A term or semester in an academic year or a summer session, as prescribed by the Board of Trustees or under their authority.

2. **Continuous attendance**
   Enrollment at the University for the normal academic year in each calendar year, or the appropriate portion or portions of such academic year as prescribed by the Board of Trustees or under their authority.

3. **Emancipated person**
   A person who has attained the age of 18 years, **or if under 18 years of age,**
   a whose parents have entirely surrendered the right to the care, custody, and earnings of such person and who no longer are under any legal obligation to support or maintain such person; or
   b a person who is legally married; or
   c a person who has no parent. If none of the aforesaid definitions applies, said person shall be deemed an "unemancipated person".

4. **Parent**
   With respect to any adopted student the word "adoptive" should be inserted before the words "father" and "mother" wherever used:
   a the person's father;
   b if the person's father is deceased, the person's mother;
   c if neither the father nor mother is living and no legal guardian is appointed, the person who then stands "in loco parentis" to the person;
   d if the father and mother are divorced, the person to whom legal custody of the person is awarded;
   e if the father and mother are divorced, separated, or unmarried and legal custody has not been awarded, the father or mother, as the case may be, with whom the person lives, or if he/she lives with neither and the father is living, the father;
   f if a legal guardian has been appointed by a court having jurisdiction, the legal guardian.

5. **Reside, residency or resident**
   This shall refer to domicile, i.e., a person's true, fixed and permanent home or place of habitation, where he/she intends to remain permanently or for an indefinite time.

Section II. Classification

1. For the purpose of assessing tuition and fees, each student shall be classified as a "Massachusetts resident" or a "Non-Massachusetts resident." A person shall be classified as a Massachusetts resident if he/she (or the parent of an unemancipated student) shall have resided in the Commonwealth of Massachusetts for *twelve months immediately preceding the first day of classes* of the academic period for which the student enrolls with the intent of making Massachusetts his/her true residency.

Physical presence for this entire twelve month period need not be required as long as the conduct of the individual, taken in total, manifests an intention to make Massachusetts his/her permanent dwelling place.

Section III. Determination of Residency

1. Proof of Residency

a Each case will be decided on the basis of all facts submitted with qualitative rather than quantitative emphasis. No given number of factors is required for residency, since the determination in each case is one of the subjective intention of the person to reside indefinitely in Massachusetts. No single index is decisive. The burden of proof rests on the student seeking classification as a Massachusetts resident.

b The following shall be primary indicia of residency:

1 Residency of parents, having custody, within Massachusetts;
2 Certified copies of federal and state income tax returns;
3 Permanent employment in a position not normally filled by a student;
4 Reliance on Massachusetts sources for financial support;
5 Former residency in Massachusetts and maintenance of significant connections there while absent.

c The following shall be secondary indicia of residency, to be considered of less weight than the indicia listed above in subsection (b):

1 Birth Certificate;
2 Motor vehicle registration and/or operator's license;
3 Voting or registration for voting;
4 Property ownership;
5 Continuous physical presence in Massachusetts during periods when not enrolled as a student;
6 Military home of record;
7 All other material of whatever kind or source which may have a bearing on determining residency.

2. Proof of Emancipation

A student asserting that he/she is an emancipated person shall furnish evidence to support such assertion. Such evidence may include:

a Birth certificate or any other legal document that shows place and date of birth;

b Legal guardianship papers — court appointment and termination must be submitted;

c Statements of the person, his/her parent(s), guardian(s), or others certifying no financial support;

d Certified copies of federal and state income tax returns filed by the person and his/her parent(s);

e Where none of the foregoing can be provided, an affidavit of the emancipated person in explanation thereof and stating fully the grounds supporting the claim of emancipation.

3. Presumptions, etc.

a Residency is not acquired by mere physical presence in Massachusetts while the person is carrying on a course of study at the University.

b A person having his/her residency elsewhere than in Massachusetts shall not be eligible for classification as a Massachusetts resident for tuition purposes, except as herein provided.

c Any person who is registered at the University as a Massachusetts resident shall be eligible for continued classification as a Massachusetts resident for tuition purposes (until attainment of the degree for which he/she is enrolled) during continuous attendance at the institution.

d Unless evidence to the contrary appears, it shall be presumed by the approving authority of the University that:

1 The spouse of any person who is classified or is eligible for classification as a "Massachusetts resident" is likewise eligible to classification as a "Massachusetts resident". This provision will not apply in the case of a spouse in the United States on a nonimmigration visa.

2 A person who is not a citizen of the United States must meet the same requirements for establishing residency in Massachusetts as are required of a citizen. In addition a non-citizen of the United States, if required to hold a visa, must hold the type of visa which permits establishment of Massachusetts residency. Parole refugee status will be considered a type of visa which permits establishment of Massachusetts residency.

e A person does not gain or lose in-state status solely by reason of his/her presence in any state or country while a member of the Armed Forces of the United States.

f Notwithstanding the twelve-month period provided for in Section II.1 above, the following persons shall be presumed to be Massachusetts residents unless the contrary clearly appears:

1 A member of the Armed Forces of the United States who is stationed in Massachusetts on active duty pursuant to military orders, his/her spouse and dependent students.

2 Full-time faculty, professional staff, and classified staff employees of the University of Massachusetts system and their spouses and dependent students.

g Notwithstanding the provisions of section II.1, any student certified by his/her state for participation in the New England Regional Student Program shall be assessed tuition and fees as if he/she were a Massachusetts resident.

Section IV. Reclassification

1. Any emancipated student classified as a "Non-Massachusetts resident" who has established a residency in Massachusetts, which residency shall have been of twelve months' duration by the first day of classes of the academic period for which he/she registers, shall be eligible for reclassification as a "Massachusetts resident" effective in such academic period.

2. Any unemancipated student classified as a "Non-Massachusetts resident" whose parent has established a residency in Massachusetts, which residency shall have been of twelve months' duration by the first day of classes of the academic period for which said student registers, shall be eligible for reclassification as a "Massachusetts resident" effective in such academic period.

Section V. Appeals

Any student or applicant who is unwilling to accept the ruling relative to his/her residency classification or who wishes to seek reclassification may submit a Residency Appeal Form to the University Residency Appeal Committee. The decision by this Committee is final and may not be appealed further.

In any case where the Admissions Office is unable to make an initial determination based on the evidence submitted, the student or applicant may be required to submit a Residency Appeal Form before being classified as a resident or a nonresident.

Section VI. Penalties for Misrepresentation

Misrepresentation in or omission from any evidence submitted with respect to any fact, which if correctly or completely stated, would be grounds to deny classification as a Massachusetts resident, shall be cause for exclusion or expulsion from or other disciplinary action by the University.

GENERAL INFORMATION
Facilities

Library

The University Library holds a book collection numbering approximately 300,000 volumes, and currently receives more than 2700 domestic and foreign journals and newspapers. It also has a growing collection of government documents and a Fine Arts and Music section with listening carrels. A Science Library is located on the second floor of the Science Building, and contains the collections in Biology, Chemistry, Mathematics and Physics. There is also a small, specifically designed collection for the students and faculty of the College of Public and Community Service (CPCS) in the library on the mezzanine at 100 Arlington Street.

The University Library is centrally located on the plaza of the Harbor Campus and is easily accessible from the enclosed walkway which connects almost all the buildings on campus. Its physical arrangements include comfortable study environments of several descriptions: carrels, tables and a few small rooms in which a group of students may study together. Its public catalog holds a record of every book in all the University libraries. The resources of the three libraries work together to support the teaching programs of the University at every level.

- University Library — Mon — Thurs, 8am-10pm
Fri, 8am-5pm
Sun, 1pm-8pm
- Science Library — Mon — Thurs, 8am-10pm
Fri, 8am-5pm
Sun, 1pm-8pm
- CPCS Library — Mon — Thurs, 9am-9pm
Fri, 9am-5pm
Sun, 12pm-6pm

Physical Education Complex

The University's $9 million physical education complex, the Catherine Forbes Clark Memorial, is the most recent addition to the Harbor Campus. The complex includes a competition-sized hockey rink, swimming pool, and basketball court, with gyms for exercise, dance and handicapped athletics. Outdoor tennis courts and athletic fields will soon be constructed adjacent to the Clark Memorial.

Center for Media Development

UMass/Boston's Center for Media Development provides a full range of audio-visual equipment and consultation for instructional and other University-related purposes. This equipment is located in each of the colleges in areas designated as Media Labs. The College Media Labs are designed to provide 'hands on' access to display and mini-production audio, video, and mixed media equipment on a University-wide scheduled basis. In addition, adjoining college language laboratories are available for use in conjunction with foreign language courses. The tapes used in laboratory sessions are closely correlated with classroom studies and many are produced within the University Media Center.

The UMass/Boston Media Center, located in the University Library, is a sophisticated media production facility. The Center is equipped with a computer-assisted video editing system, a multitrack audio studio, and associated graphic production space. The Media Center is designed to produce high quality software for use within the University and outside educational and community distribution. In addition, the Media Center in collaboration with individual academic departments and activity centers offers media-related courses and workshops through its staff and other production resources.

John F. Kennedy Library

The John F. Kennedy Presidential Library, a public institution for education and research, stands on the coastal edge of the Harbor Campus. The I.M. Pei-designed facility was established to preserve and make available the documents and memorabilia of President Kennedy and his contemporaries in politics and government. Its archival collection includes approximately twenty-eight million pages of documents, six and a half million feet of film, and over one hundred thousand still photographs. The JFK Library is linked to the University by a series of educational programs which allow students and their instructors to share in its rich resources.

Programs and Services

Athletics and Recreation

The Catherine Forbes Clark physical education complex provides a new home for UMass/Boston's varsity basketball and ice hockey teams, and greatly augments the University's athletics and recreation program. In addition to the complex, the Harbor Campus holds a range of recreational facilities housed in the college buildings, including a gym, pool, weight training rooms, and handball and squash courts.

The facilities are open to the students, faculty and staff during the week. Community use of the athletic facilities is permitted during specified evening and weekend hours. Schedules of usage are posted each semester. Outdoor facilities include two athletic fields which are marked for football, soccer, softball, volleyball, and horseshoes.

The University's sailing dock moors ten Mercury sailboats and eight rowing dories which are available for use during the spring, summer and fall. A swimming test is required of all who wish to participate in water sport activities. For sailing, a Helmsman Test is administered by the sailing instructor. Once the test is passed the boats may be taken out whenever there is one available.

Athletic Services:
Intramural Sports Program, Building 020, floor 2, room 617 (x2449)
Gymnasium, handball and squash courts, Building 020, floor 1
Swimming pool, handball and squash courts, Building 010, floor 3
Weight and Exercise Room, Building 010, floor 4
The above facilities are available Monday through Thursday, 9:30am-8:30pm, and Friday, 9:30 am-5pm.

Bookstore

Located in the Administration Building, the bookstore carries all textbooks required for courses, a complete line of art and school supplies, and gift items. It also carries a selection of paperbacks. Special orders can be made for almost any other book in print. The bookstore pays cash for used books every Thursday. It is open Monday through Friday, 9am-5pm.

Child Care

The University operates two Child Care Centers for children of University students, faculty, and staff. The toddler program includes children between the ages of 18 months and three years; the pre-school program includes three to five year olds. Teachers in the program work together with student teachers, work-study students, and volunteers to develop and implement the curriculum. The centers are licensed by the Office of Children for 60 full-time equivalent positions, and maintain a Title XX contract for 28 slots.

Disabled Student Center

The Resource and Counseling Center for Disabled Students provides counseling to individual students, as well as peer counselor training. Reading and tutorial services are also offered. The physical resources of the Center include a tape library, a Braille library, typewriters, and other Braille equipment, and a teletypewriter for deaf persons (TTY: (617) 287-1960). The Center aims to meet the needs of any student who requests its services. A Satellite Center at the Downtown campus provides services to physically disabled students and those funded through the Massachusetts Rehabilitation Commission.

Campus Ministry

The Campus Ministry is an interfaith Chaplaincy Service actively involved in the spiritual and human development of students, faculty and staff. Catholic, Protestant, Jewish and Orthodox Chaplains are available to all.

The Chaplaincy Office is a relaxing place to meet other students, share hospitality, and become aware of the liturgical, educational, and spiritual programs offered by the Ministry. The Pastoral Counseling and Educational Office may be used for a private consultation with any member of the chaplaincy staff or for participation in any of the on-going groups operating out of the Campus Ministry. Such groups include Bread for the World, a hunger study and action group, Bible Study and Fellowship, Faith and Values Sharing Group, Parent Group Education, Scriptural Seminars, and a Christ on Campus Prayer Group.

Career Planning and Placement Services

The University Career Planning and Placement Service is a central resource center for undergraduates, graduates, and alumni/ae regarding all aspects of job placement and employment opportunities. The Job Skills Bank operated by the Service brings distinguished alumni/ae to the campus to discuss ideas and employment opportunities. The Job Employee Matching System (JEMS) is a computerized service which offers seniors, graduate students, alumni/ae, and employers easy access to each other in order to match an applicant to appropriate positions. Additional job sources include career job binders containing all incoming job opportunities.

Extended Day

UMass/Boston has one of the largest selections of evening courses in the greater Boston area. These Extended Day courses (offered after 5pm) are taught largely by the University's regular, full-time faculty. The credits an Extended Day student earns are in no way different from the credits earned by a student attending classes during the day. The Extended Day Program is an integral part of the University.

Housing and Transportation Office (HTO)

The Housing and Transportation Office is located on the third floor of the Administration Building. The HTO functions as the campus resource center for matters related to housing and transportation. The staff is prepared to provide the following services for University students, faculty and staff:

Transportation

Directions to campus by public transit
Directions to campus by automobile
Parking procedures and regulations
Shuttle bus schedule
MBTA bus schedule
Car pooling services/information

Housing

Apartments, houses for rent or sale
Apartments needed
Roommates needed
Tenants' rights information
Lease terminology information

Informational Services (INFO)

INFO is the one-stop communications network and informational resource/referral service at the Harbor Campus. Committed to gathering and disseminating information throughout the University community, INFO provides a multitude of communications related services.

Three INFO resource/referral centers are maintained for registration and referral of University departmental offerings, requirements, events, and activities. This clearinghouse of information logs campus information, composes the Weekly Calendar of Events and University Notices, stamps all posters for display on campus, and provides a daily listing of University activities. For prospective students and the general public, tours of the University may be booked by the INFO office.

Summer Session

Selected graduate courses are offered during the Summer. The Summer Session operates on a fee assisted, self-supporting basis; thus courses are offered only when sufficient student demand is demonstrated. Details regarding course offerings, tuition, and fees may be found in the Summer Session *Bulletin*.

Teacher Certification Program

Students seeking careers in education may avail themselves of the services of the Teacher Certification Program. The staff provides information and counseling to all students preparing for teaching careers. In addition, the program enables highly qualified students to satisfy Massachusetts requirements for Teacher Certification. Since UMass/Boston offers no major in Education, a teaching candidate pursues the University's normal degree and major sequences. At the same time, by judicious choice of electives from among those offered by several departments, one may acquire credits in courses approved for certification. The program culminates in the student's final year when, under the direction of the faculty of the major department, the student enters student teaching and participates concurrently in a Curriculum and Methods Seminar.

Specific information concerning certification requirements and approved courses is available at the Teacher Certification Program Office.

Student Activities

The extra-curricular life of the campus centers around activities sponsored primarily through the Office of Student Activities and funded by the Student Activities Trust Fund. Established by the University Board of Trustees, the fund is comprised of a mandatory student activities fee of $18 per semester and $7 per summer session, payable at course registration. The quarter of a million dollar trust fund is administered by a professional staff upon recommendations from an elected student committee.

The University Student Activities Committee (SAC) is composed of 24 students elected annually by the student body as either collegiate or at-large representatives. The SAC is governed internally by a Chairperson, Secretary, and Treasurer who are elected to their posts by the committee itself. The SAC also has four standing subcommittees, each made up of 6 of the 24 members. These subcommittees include Community Action, Media and Publications, Cultural Events, and Recognized Student Organizations (clubs). The entire committee holds responsibility for overseeing, coordinating, and allocating funds for student activities both on and off campus.

In addition to the clubs listed below, the SAC maintains the Harbor Gallery, the Pub Club, the Student Book Exchange, the Student Advocacy Center, the University radio station — WUMB, a photo offset composition shop and printing press — Point Press, the school newspaper — *Mass Media,* and a Ticket Series for reduced rates at Boston area cultural and athletic events. Further information concerning current program offerings is available from the Student Activities Office.

Student clubs presently receiving funding include, but are not necessarily limited to, the following:

Above the Average Age Student Organization
African Student Union
American Marketing Association
Anthropology
Arabic Student Center
Architectural Society
Armenian Club
Asian-American Society
Biology Club
Book Bazaar
Chemistry Club
Chess Club
College Republicans
Columbia Point Cycling Club
Committee Against Racism
Computer/Math Club
Disabled Student Club
Drama Club
Earth Foods Restaurant
Economics Club
English Club
Film Series
Food & Nutrition
French Club
Gay People's Group
German Club
Graphic Arts Club
Greek Club
Harbor Art Gallery
Humane Energy Alternative Club
Hillel Club
Hispanic Student Center
History Club
Human Resource Management
Human Rights Project
Imani
International Association
Irish Historical Society
Italian Club
Ja Sin Do
Karate Club
Latin American Student Union
Lecture Series

Mass Media
Mass PIRG
Multi-Media
Music Club
Native American Club
Network
Norlantic Reef Combers
Parents' Support Group
Philosophy Club
Physics Club
Photography Club
Point Press
Politics Society
Portuguese Student Club
Prison Reform Group
Puerto Rican Student Union
Pub Club
Rock 'n Roll Club
Runners' Club
Sailing Club
Ski & Outing Club
Social Events
Spanish Club
Spartacus Youth League
Students for Service Workers
Student Advocacy
Student Veterans Union
Ujima
Urban Students
Wavelength
Welfare Associates
World Affairs
Women's Center
Women's Self-Defense Group
Women Against Sexual Harassment
WUMB Radio
Yearbook

GRADUATE PROGRAMS
Master's Degree Requirements

The basic requirements for the master's degree are given below. Students should consult the individual program descriptions for further requirements.

1. Thirty graduate credits. Up to six credits of grade B or better may be transferred from other institutions with the consent of the graduate program. Twenty-one of the 30 credits must be in the major field. Up to six credits may be counted from upper division work with the consent of the graduate program.

2. The thesis and general examination are optional with the graduate program but if required, they shall be under the supervision of a committee recommended by the program. The thesis committee will consist of members of the faculty at the discretion of the Graduate Program Director, and should be appointed as soon as possible after the student's first graduate registration. As soon as the student arrives on campus, and prior to the appointment of a thesis committee, an advisor or guidance committee should be appointed for the student from the members of the faculty. Once the student has selected his/her thesis topic, the guidance committee may serve as the thesis committee, although these two committees are not necessarily the same.

   The thesis must be approved by the thesis committee, the Graduate Program Director, the advisor, and those members of the faculty in the program designated by the Graduate Program Director to approve the thesis. The general examination (not limited to the thesis) is conducted by an examining committee of at least three members of the faculty. The recommendation of a majority of the members of the examining committee shall be requisite to receiving the degree. If a student offers a thesis, problem courses shall be limited to six credits.

3. All foreign language requirements for the master's degree are optional with the program.

4. Course credits used by any student for fulfilling the requirements for a master's degree may not be used by the student for fulfilling the requirements for any other master's degree at this University.

Biology

Faculty

Kamaljit Bawa, PhD, Punjab University, *Plant Ecology*

Ruth Bennett, PhD, Tufts University, *Neurophysiology*

John Ebersole, PhD, UCLA, *Marine Ecology*

John A. Freeberg, PhD, Harvard University, *Plant Morphogenesis*

William Hagar, PhD, Temple University, *Photosynthesis*

Bettina Harrison, PhD, Boston University, *Immunology and Ultrastructure*

Jeremy Hatch, PhD, Duke University, *Animal Behavior and Ecology*

Lawrence Kaplan, PhD, University of Chicago, *Archeological Botany*

Christine Armett Kibel, PhD, University of London, University College, *Neurophysiology*

Herbert Lipke, PhD, University of Illinois, *Biochemistry*

Charles Puccia, PhD, Massachusetts Institute of Technology, *Ecosystems Analyst*

Michael Rex, PhD, Harvard University, *Marine Ecology*

Fuad Safwat, PhD, Washington University, *Plant Morphogenesis*

Ruth Schmitter, PhD, Harvard University, *Algal Biology*

Edna Seaman, PhD, University of Illinois, Urbana, *Molecular Genetics*

Harland Sheerin, PhD, University of Maine, *Animal Physiology*

Claire Van Ummersen, PhD, Tufts University, *Developmental Biology*

Nevin Weaver, PhD, Texas A&M, *Biology of Insects*

Richard White, PhD, Washington University, *Vision Physiology*

Garrison Wilkes, PhD, Harvard University, *Plant Genetics and Evolution*

Admission Requirements

In addition to the University-wide requirements for admission, each applicant to the Graduate Program in Biology must submit a completed application form, three letters of recommendation, and scores of the Graduate Record Examination including one advanced test. An applicant is expected to have a grade point average of 3.0 in all undergraduate science and mathematics courses. The stated interests of a prospective student must coincide to an acceptable degree with faculty specialties represented in the program. The Biology Graduate Committee is responsible for reviewing applications and for recommending candidates to the Associate Provost for Graduate Studies.

The Program and Facilities

The Biology Program is designed to accommodate students of various backgrounds who wish rigorous training leading to the Master of Science degree in Biology.

Our modern facilities support programs in most phases of biology and include all of those normally found in laboratories in the biological sciences. There are special research laboratories for graduate courses. Equipment, such as electron microscopes, amino acid analyzers, and controlled-temperature growth chambers, is available for graduate student use.

The Campus is located on Boston Harbor, and therefore one type of marine environment is readily accessible; in addition, arrangements can be made for the use of the marine facilities on Nantucket Island and at Gloucester. Through cooperation of the Waltham Field Station of the University, we have facilities for large plantings of botanical materials. There are other institutions in the area with which we have informal arrangements so that some rather specialized facilities can be made available if they are needed.

A new track in Applied Marine Ecology will be implemented in the fall of 1980.

Degree Requirements

Thirty credits are required for the master's degree. Each student will be assigned to a three-member advising committee which will consider the student's training and goals and, in consultation with the student, establish an appropriate program of study. The advising committee will be responsible for insuring that the candidate for a degree fulfills all requirements of the Biology program and the Office of Graduate Studies. Students who choose to write a thesis will have a thesis advisor and must enroll in Biol 900 (Thesis Research). All other students are required to take Biol 901 (Projects in Biology). In addition, all students must take at least one semester of Biol 750 and Biol 751 (Scientific Communication I and II), as partial fulfillment of master's degree requirements.

Graduate students may select courses at the 600 level or above, subject to the permission of the instructor. All 600 level courses are open to both advanced undergraduate and graduate students. One course may be selected from the course offerings in the Biology Department at the 300-500 level, subject to the approval of the student's advisor and of the program's Graduate Committee. The student will be expected to perform extra work in such a course. One elective course may be selected from course offerings of other departments in the University at the 200 level or above, subject to the approval of the student's advisor and the Biology Graduate Committee.

A student writing a thesis will be required to submit a thesis outline to the thesis committee for approval at least three months prior to the master's oral examination. Once approved and signed by each committee member, a copy of the outline will be placed in the student's file. All master's candidates must take a general oral examination which will not be limited to the thesis topic. The examination is conducted by a committee of at least three members of the Biology faculty.

The student must deposit the original copy of his/her thesis, with the University Library and pay the cost of binding. Another copy will be deposited with the Biology Department. Each graduate student will be required to submit a completed **Certification of Eligibility for a Master's Degree** form for the Graduate Program Director's signature prior to receiving the degree. The form should be filled out by the student.

List of Courses

Biol 602 Plant Physiology
Current developments in plant physiology, morphogenesis and bio-chemistry.
Prerequisite: Permission of instructor.
Hrs. by arrangement 3-5 Credits

Biol 604 Biology of Cities
Aspects of the origin and development of cities relevant to human biology, food, air, water, energy, waste, and flow of those resources into and out of cities.
Prerequisite: Introductory Biology.
3 Lect-Disc Hrs and additional field trips 3 Credits

Biol 610 Ethnobotany
Review of studies on plant use by primitive societies in historic and prehistoric times. Ordinarily offered in conjunction with Biol 613.
Prerequisite: Permission of instructor; Biol 105, 220 recommended.
2 Seminars or Tutorial Hours 2 Credits

Biol 612 Advanced Cell Biology
The analysis of gene transfer and expression at the cellular level, including the nature of metabolic systems and the factors governing their regulation.
Prerequisite: Permission of instructor.
Hrs by arrangement 3-5 Credits

Biol 613A Archeological Botany
Laboratory tutorial: recovery, identification and analysis of macroscopic remains, pollen and spores from archeological and geological deposits; interpretation of the data derived and their botanical, archeological and paleo-ecological applications.
Prerequisite: Permission of instructor; ordinarily Biol 610 will be required (number of credit hours will be determined by prior consultation with instructor).
3 Lab-Disc Hrs Per Credit 2-5 Credits

Biol 614 Advanced Cell Chemistry
The methodology of cell analysis, with emphasis on macromolecules and intermediary metabolites.
Prerequisite: Permission of instructor.
Hrs by arrangement 3-5 Credits

Biol 618 Evolution Under Domestication
The origin, evolution and phylogenetic relationships of domesticated and semi-domesticated plants and animals; the influence of cropping and herding on natural floras and faunas of the world.
Prerequisite: Biol 241, 242 or equivalent and permission of instructor.
3 Lect Hrs and Saturday Field Trips 3 Credits

Biol 622 Concepts and Methods in Cytology
The structural basis of cellular and subcellular functions, with practical experience in methods of visualizing cellular structure.
Prerequisite: Permission of instructor.
Hrs. by arrangement 3-5 Credits

Bio 624 Algal Physiology
Examination of current research areas in algal physiology, selected from such topics as algal nutrition, chromatic adaption, symbiotic relationships, control of planktonic sinking rates, secretion of specialized products (polysaccharide, carbonate, silica), and control of sexuality.
Prerequisite: Biol 211 and 324 or permission of instructor.
2 Lect Hrs 1 Sem Hr 3 Credits

Biol 625 Insect Biology
A course devoted to the physiology and biochemistry of insects. Those adaptations that have made insects the most successful group of animals will be emphasized. The laboratory portion of the course will stress the morphology, diversity and classification of insects.
Prerequisite: Biol 211, 240 and 371.
3 Lect Hrs 3 Credits

Biol 630 Natural History of Marine Invertebrates
A lecture and field course devoted to the examination of convergent and divergent ecological, behavioral and morphological adaptations of marine organisms in different habitats. The course will draw heavily on the resources of Boston Harbor. The first half of the semester consists of lectures and demonstration laboratories; the second half includes weekly field trips. The first half of the course will be indoor lectures — 3/wk — and demonstration laboratories — 1 Hr/wk. The second half will have 1-2 lectures/wk and one 4 Hr field trip/wk.
Prerequisite: Biol 211, or 234, 341, 342 and/or permission of instructor. 3-5 Credits

Biol 632 Advanced Evolution
An inquiry into the modern synthetic theory of evolution with emphasis on population genetics, ecological genetics, evolution of dominance, genetic homeostasis, canalization and genetic theory of polymorphism.
Prerequisite: Permission of instructor.
Hrs by arrangement 3 Credits

Biol 638 Advanced Ecology
Concentration on important concepts of population and community ecology. Topics covered include population dynamics, life history strategies, theory of r- and K-selection, competition, predation, community organization, and species diversity. Particular emphasis is placed on the relationship between theoretical and empirical ecology. A weekly tutorial will provide opportunity for greater discussion of material covered in lecture. Emphasis changes from year to year.
Prerequisite: Biol 341, 342 or permission of instructor.
2 Lect Hrs, 1 Disc Hr 3 Credits

Biol 642 Biogeography
A study of geographical distribution patterns in plants and animals includes historical and descriptive aspects of the distributions of organisms, experimental and comparative tests of island biogeography theory, the population genetics and evolutionary strategies of colonizing species. Lectures by instructor, one discussion session per week, independent research by students that will be presented to the class in seminar form.
Prerequisite: Biol 341, 342 or equivalent. Some knowledge of statistics and calculus highly recommended. 3 Credits

Biol 643 Behavior Ecology of Seabirds
Adaptations of seabirds to the marine environment with particular reference to breeding biology and feeding strategies; other topics of current interest in behavioral ecology. Lectures or lecture and field work.
Prerequisite: Permission of instructor.
Hrs by arrangement 2-5 Credits

Biol 644 Marine Botany
The systematics and ecology of marine plants, with emphasis on the algae. The current literature is employed to delineate unsolved problems.
Prerequisite: Biol 211 or 341 and Biol 241 or 242 and/or permission of instructor. 4 Credits

Biol 645 Ecological and Evolutionary Aspects of Plant-Animal Interactions
Ecological and evolutionary aspects of plant-animal interactions. Coevolution of plants and animals will be examined in an ecological context. Interactions to be examined include pollination seed predation, herbivory and grazing. The role of these interactions in the regulation of community structure will be discussed. Although emphasis will be on tropical communities, alpine, temperate, and desert communities will also be covered.
Prerequisite: Biol 341 or permission of instructor.
3 Lect Hrs 3 Credits

Biol 646 Pollutants in Marine Food Chains
Examination in depth of the entry of selected pollutants into the oceans, their movements, distribution and effects within marine organisms. Where possible, case studies from New England will be used.
Prerequisite: Organic Chemistry, Physiology, Ecology, and permission of instructor.
Hrs by arrangement 2 Credits

Biol 650 Advanced Ethology
Examination in depth of topics in the biological study of behavior-Ethology with particular reference to communication and the evolution of social behavior. There will be lecture-discussions and lab exercises, also field trips. For graduate students and seniors with appropriate background in Biol 211 and 341, or Psych 265 and permission of instructor.
2-6 Credits

Biol 660 Seminar in Developmental Biology
Current problems in developmental biology, molecular and cellular differentiation, and pattern determination.
Prerequisite: Biol 211 and permission of instructor.
3 Sem-Disc Hrs 3 Credits

Biol 662 Photobiology
The photochemical reactions that occur in biological systems. Major topic areas are: properties of light energy; utilization of light energy by photosynthetic organisms; mechanisms of visual transduction; photochemical triggering mechanisms for developmental processes.
3 Lect Hrs 3 Credits

Biol 666 Seminar in Neurobiology
Structure, function and development of sensory receptors. Neurons and muscles.
Prerequisite: Biol 211 and/or permission of instructor.
3 Lect Hrs 3 Credits

Biol 668 Advanced Physiology
Experimental studies on two or three selected areas of organismal and cellular physiology will be conducted in depth each time the course is offered (probably spring term each year). Studies of sensory and nervous systems and of membrane transport will be the areas covered. Provisions will be made for independent projects during the course. One weekly seminar plus one weekly lab meeting. Open to graduate students and to qualified advanced undergraduates.
Prerequisite: Biol 216, 372 or equivalent, Organic Chemistry, Physics, and permission of instructor.
1 Sem Hr; 3-4 Lab Hrs 3-4 Credits

Biol 670 Tissue and Organ Culture
Methods of plant and animal tissue and organ culture will be presented with special emphasis on problems of differentiation and morphogenisis in vitro. Introduction of certain techniques now used in plant protoplast culture and for hybridization of somatic cells in plants and animals. Provisions will be made for independent projects during the course.
Prerequisite: Permission of instructor.
1 Lect Hr, 6 Lab Hrs 3-4 Credits

Biol 672-673 Directed Readings in Biology
Selected readings in advanced areas of biology with guidance and regular discussion.
Prerequisite: Permission of instructor.
Hrs by arrangement 1-3 Credits

Biol 680 Methods in Comparative Biochemistry
Analysis of tissues and subcellular particulates from microorganisms, plants, invertebrate and vertebrate animals to reveal physiological differences and evolutionary trends as expressed by chemical differences. The use of chromatography, spectrophotometry, tracer methodology and chemical derivation for the analysis of tissues and orgnelles isolated by dissection and differential centrifugation. Techniques for cell disruption and sampling will be presented along with instruction in the operation of equipment for the separation, purification and identification of tissue constituents.
Prerequisite: Permission of instructor.
6 Lab Hrs 2 Credits
9 Lab Hrs 3 Credits

Biol 690 Concepts in Modern Biology
A field of biology of current interest is examined in detail.
Prerequisite: Permission of instructor.
Hrs by arrangement 2-5 Credits

Biol 720 Cell Ultrastructure
Ms. Harrison, Ms. Kibel, Ms. Schmitter and Mr. White
Concepts of cell ultrastructure and methods of electron microscopy. Open to graduate students whose field of research involves cell ultrastructure.
Prerequisite: Graduate standing and permission of instructor.
Hrs by arrangement 3-5 Credits

Biol 750-751 Scientific Communication I & II
Two-semester course required of all graduate students in Biology during their first year. Develops skills in library research and clear technical writing.
2 Sem Hrs and mandatory attendance at Biology Department seminars 2 Credits

Biol 900 Thesis Research
Substantial laboratory or field research resulting in a master's thesis. This course may not substitute for Biol 901 (these two courses are mutually exclusive). No more than 10 credits of this course may be applied to the master's degree. The credit may be applied over more than one semester.
Hrs by arrangement 10 Credits

Biol 901 Projects in Biology
A substantial written report based on library research or an original project such as curriculum design, design of teaching aids and exercises, critique of a book or theory, etc. No more than 6 credits of this course may be applied to the master's degree. The credit may be applied over more than one semester. (Biol 900 and Biol 901 are mutually exclusive.)
Hrs by arrangement 6 Credits

Chemistry

Faculty

Joseph S. Alper, PhD, Yale University, *Theoretical Chemistry*

Jean-Pierre Anselme, PhD, Polytechnic Institute of Brooklyn, *Synthesis and Mechanisms of Organic Nitrogen Compounds*

Ernest I. Becker, PhD, Western Reserve University, *Organometallic Compounds Phytobiologically Important Compounds*

Robert L. Carter, PhD, University of Kansas, *Structural Studies of Inorganic Solids by Infrared and Raman Spectroscopy*

Robert I. Gelb, PhD, University of Wisconsin, *Chemistry of Electrode Processes and of Solution Equilibria*

Daniel A. Laufer, PhD, Brandeis University, *Synthesis and Properties of Biomolecules, Polymeric Reagents*

Thomas N. Margulis, PhD, University of California at Berkeley, *X-Ray Crystallography of Drugs and Natural Products*

Thomas C. Rounds, PhD, Massachusetts Institute of Technology, *Conformation and Intramolecular Dynamics of Organic and Biological Molecules*

Lowell M. Schwartz, PhD, Massachusetts Institute of Technology, *Physical Properties of Oxocarbons Statistical Treatment of Data*

Mary Jane Schultz, PhD, Massachusetts Institute of Technology, *Vibrational Laser Chemistry and Energy Transfer within Molecules*

Hans van Willigen, PhD, University of Amsterdam, *Application of Spin Resonance in the Study of Structure and Dynamics*

Chi-Hua Wang, PhD, St. Louis University, *Chemistry of Free Radicals in Solution*

Walter E. Weibrecht, PhD, Cornell University, *Equilibrium Studies of Transmination of Silviamines*

Leverett J. Zompa, PhD, Boston College, *Chemistry of Transition Metal Complexes*

Admission Requirements

The Chemistry Department will recommend admission to the program for those applicants who present evidence of their ability to do graduate work with distinction. Such evidence normally will include:

1 a distinguished undergraduate transcript with at least an average of B or 3.0 in undergraduate Chemistry courses;

2 at least three encouraging and informed letters of recommendation. While not required, the submission of Graduate Record Examination Scores (aptitude and advanced tests) is highly recommended.

The Program and Facilities

A master's degree program is offered which will serve graduate students with interest in applied chemical research as well as students with interests in some interdisciplinary, chemistry-related field. The degree requirements are flexible in order to allow a student to take as many as half of his/her graduate courses outside of chemistry and to enable him/her to submit a thesis in a tangential area. We envisage candidates working in such widely diverging fields as laboratory research, chemical economics, history of chemistry, biological chemistry, and chemical writing and editing. All candidates for the degree of Master of Science are required to take one graduate chemistry course in each of the three areas of Synthesis, Structure, and Dynamics. These courses which cut across the traditional boundaries of organic, inorganic, analytical and physical chemistry, are designed to give students of diverse backgrounds and with diverse aims a broad overview of the recent advances in chemistry. Three elective courses will allow the student to specialize in a field of his/her choice. Thus, for students aiming toward a research-oriented PhD degree, the option is available of taking a maximum number of chemistry courses and electing to work on a research project.

This flexible program is designed for recent graduates as well as people having positions in high schools, community colleges and industry who are seeking advancement by extending professional training. Attempts will be made to make scheduling arrangements for those who must study part-time.

The Department of Chemistry is housed in the spacious, air-conditioned Science Building at the Harbor Campus. Facilities include laboratory space for research of fifteen faculty, a science library, and glassblowing, machine and electronic shops.

Research facilities presently available include:

- numerous uv, vis and ir spectrophotometers
- an ORD/CD and laser Raman spectrophotometer
- nuclear magnetic resonance and electron spin resonance equipment
- a fully equipped laboratory for X-ray crystallographic studies
- instruments for flash photolysis
- a tunable dye laser
- electroanalytical and radiochemistry equipment
- analytical and preparative gaschromatographs
- extensive computing facilities

Degree Requirements

The candidate is required:

1. To take six one-semester courses of which one is to be in *each* of the areas of Dynamics, Structure and Synthesis (4 credits per course). All students *must* successfully complete (B or better) Chem 701, 711, and 721 in order to become degree candidates.
2. To participate in a seminar program. This requirement includes the oral presentation of two (2) seminars.
3. To submit and defend an original contribution (thesis) in chemistry or in a chemistry related field (10 credits maximum).

The elective courses can be selected from course offerings of other departments in the University subject to the approval of the Chemistry Graduate Committee.

For graduation the candidate needs 30 graduate credits. Up to six credits of grade B or better may be transferred from other institutions subject to the approval of the Chemistry Graduate Committee.

List of Courses

Chem 615 Topics in Physical Chemistry
Topical discussions, each based on elementary principles of physical chemistry and progressing toward recent developments in the field. Open to graduates and advanced undergraduates.
Prerequisite: Chem 341 and 369, or equivalent.
3 Lect Hrs 3 Credits

Chem 655 Topics in Organic Chemistry
Topical discussions of selected topics of current interest in organic chemistry. Open to graduates and advanced undergraduates.
Prerequisite: Chem 254 or 256, or equivalent.
3 Lect Hrs 3 Credits

Chem 670 Topics in Inorganic Chemistry
Topical discussion of selected topics of current interest in inorganic chemistry.
Open to graduates and advanced undergraduates.
Prerequisite: Chem 370, or equivalent.
3 Lect Hrs 3 Credits

Chem 701 Chemical Dynamics I
Discussions and outside readings in the areas of chemical and physical equilibria and rate processes. Emphasis on thermodynamics from classical and statistical points of view and on chemical reaction mechanisms.
Prerequisite: Acceptance into the Graduate Chemistry Program or permission of instructor.
Hrs by arrangement 4 Credits

Chem 702 Chemical Dynamics II
Three or four selected topics of interest to students and staff involved. Typical subjects: molecular transport processes and the Kinetic Theory; photochemistry and excitation transfer processes; surface and electrode rate processes; particle collision dynamics and reactivity; irreversible thermodynamics; interaction of radiation and matter; molecular state transitions.
Prerequisite: Acceptance into the Graduate Chemistry Program, or permission of instructor.
Hrs by arrangement 3 Credits

Chem 711 Chemical Structure I
Structure determination and theory. Three or four molecules of interest to the students and faculty involved are chosen. Based on these molecules, discussions, readings and laboratory exercises attempt to show how a chemist determines each structure and how the structure is understood by modern chemical theory.
Prerequisite: Acceptance into the Graduate Chemistry Program or permission of instructor.
Hrs by arrangement 4 Credits

Chem 712 Chemical Structure II
In tutorial form. Individual students study advanced structure topics with appropriate staff members.
Prerequisite: Acceptance into the Graduate Chemistry Program or permission of instructor.
Hrs by arrangement 3 Credits

Chem 721 Chemical Synthesis I
The tactics and strategy of accomplishing the synthesis of a chemical substance. Examples of organic and inorganic systems.
Prerequisite: Acceptance into the Graduate Chemistry Program or permission of instructor.
Hrs by arrangement 4 Credits

Chem 722 Chemical Synthesis II
The synthesis and characterization of a number of representative organic and inorganic compounds.
Prerequisite: Acceptance into the Graduate Chemistry Program or permission of instructor.
Hrs by arrangement 3 Credits

Chem 725 Seminar I
Prerequisite: Acceptance into the Graduate Chemistry Program or permission of instructor.
Hrs by arrangement 1 Credit

Chem 726 Seminar II
Prerequisite: Acceptance into the Graduate Chemistry Program or permission of instructor.
Hrs by arrangement 1 Credit

Chem 780 Independent Study
Study of a particular area of chemistry under the supervision of a faculty member.
Prerequisite: Permission of instructor.
Hrs by arrangement 1-10 Credits

Chem 790 Master's Thesis
Open to Degree candidates.
Hrs by arrangement 1-10 Credits

Critical and Creative Thinking

Faculty

Edmund Beard, PhD, Columbia University, *Public Policy Formation and Implementation (Political Science Department)*

Augusto Blasi, PhD, Washington University, *Developmental Psychology, Adolescence, and Personality (Psychology Department)*

Lawrence Blum, PhD, Harvard University, *Ethics and Moral Philosophy (Philosophy Department)*

Dennis L. Byrnes, PhD, Brandeis University, *Human Memory and Learning (Psychology Department)*

Clyde Evans, PhD, Michigan State University, *Critical Thinking, Moral Education, Philosophy of Law (Philosophy Department)*

Dolores Gallo, EdD, Harvard University, *Elementary Education, Creativity and Learning (Teacher Certification Program)*

Claire Golomb, PhD, Brandeis University, *Symbol Formation in Child Art and Dramatic Play (Psychology Department)*

Jane Martin, PhD, Harvard University, *Philosophy of Education, Philosophy of Action (Philosophy Department)*

Michael A. Milburn, PhD, Harvard University, *Research Methods and Statistics, Communication (Psychology Department)*

Beatrice Nelson, EdD, Harvard University, *Philosophy of Education, Teacher Education, Human Development (Institute for Learning and Teaching)*

Barbara Ross, PhD, University of New Hampshire, Editor, *Journal of the History of the Behavioral Sciences; Scientific Communication: Formal and Informal Systems; History of Scientific Journals and the Dynamics of the Formal Sponsoring Organization (Psychology Department)*

Steven Schwartz, PhD, University of Illinois, *Learning, Perception, Statistics (Psychology Department)*

Arthur P. Simonds, PhD, Harvard University, *History of Politics (Political Science Department)*

Shula S. Sommers, PhD, Boston University, *Personality, Human Emotions, Affective Development (Psychology Department)*

Irvin Stock, PhD, Columbia University, *The Novel and Drama; Literature as a Reflection of the Moral Life (English Department)*

Robert Swartz, PhD, Harvard University, *Theory of Knowledge, Moral Education, Philosophy of Education (Philosophy Department)*

Helen Tager-Flusberg, PhD, Harvard University, *Language Development, Cognitive Development, Language and Cognition Disorders (Psychology Department)*

James Ward, PhD, Harvard University, *Political Theory (Political Science Department)*

Admission Requirements

The Critical and Creative Thinking Program will admit those applicants who present evidence of their ability to do graduate work with distinction. Such evidence will normally include:

1. a distinguished undergraduate transcript with a least an average of B or 3.0;
2. at least three positive and informed letters of recommendation. Letters of recommendation should be submitted by persons who are knowledgeable about teaching, who have worked closely with the applicant, and who have direct knowledge of the applicant's teaching skills.

In addition, applicants may submit results of the Graduate Record Examination or the Miller's Analogy test, and evidence of teaching competency, such as curriculum projects or lesson plans.

The program will normally admit only applicants with teaching experience, or other human service practitioners.

The Program

The Critical and Creative Thinking Program is an interdisciplinary MA program primarily involving philosophy, psychology, and education. It is designed to provide teachers and other education personnel both with an understanding of the processes of critical thinking and creativity and ways of teaching these basic skills in a variety of curriculum settings in both elementary and secondary schools. This will be accomplished through the integration of the following: psychological studies of the scope, limits, and techniques of information processing, and learning in children and young adults; philosophical studies of the techniques of reasoning, argument, and logical thinking and its expression; and ways of stimulating creativity in children. Issues in morality and ethics will be the main focus of application of these skills in 1980-81 as one way of implementing one of the major goals of the program — that of helping teachers and schools to integrate philosophical components into already existing curricula. This program combines on-campus classroom work with on-site assistance in implementing the practical aspect of the program in the schools in which the teachers work. This assistance will be provided by a member of the staff of the Institute for Learning and Teaching at UMass/Boston.

Degree Requirements

Thirty graduate credits are required to complete this program. The normal length of time that it will take to finish the program is two years. Courses will be offered in the late afternoon, evenings, and/or Saturday mornings, as well as during the summer, to suit the scheduling needs of teachers.

The program has four components:

1. a basic introductory core course to be taken at the beginning of the program (6 credits);
2. advanced core courses (6 credits);
3. electives from philosophy, psychology, or other departments (12 credits); and
4. a supervised thesis program (6 credits).

The thesis submitted at the end of the program will show evidence of mastery of philosophical and psychological material, and the ability to use these in the classroom; the thesis will normally include a research project.

List of Courses

CCT 601 and 602 Introduction to Critical and Creative Thinking
An interdisciplinary course in which the theories and techniques of reasoning, logic, and creative thought are cast within the framework of recent work in psychology about thinking, information processing, and problem solving. The development of logical thought and of creative modes of expression in children will be related to these theories and techniques. This two-semester course will be required as an entry course of all students in the program. The course will be team-taught by a psychologist, a philosopher, and an educational theorist.

3 Credits (Fall)
3 Credits (Spring)

CCT 696 Independent Study
This course is the comprehensive study of a particular topic or area of literature determined by the student's need; the study is pursued under the guidance, and subject to the examination, of the instructor. An application or outline of study should be submitted to the instructor by the end of the semester previous to the study.

2-6 Credits

CCT 697 Special Topics
This advanced course will offer intensive study of selected topics in the field of critical and creative thinking. The course content and credit will vary according to the topic and will be announced during the advance registration period.

3-6 Credits

CCT 699 Thesis Research
A two-semester supervised practicum course designed to help students to complete the required thesis. In the first semester, class meetings relate material in the academic disciplines to teaching and to thesis projects; and classroom supervision and individual consultation help the student in the preparation of the thesis proposal and the beginning of actual research. In the second semester the student will complete the thesis.

The thesis shall be a substantial piece of research on some facet of the thinking process as it is defined and understood in one or more of the fields of psychology, philosophy, education. It may take the form of a theoretical paper or that of an empirical study.

A student who is writing a thesis will have a thesis committee of three persons, a primary advisor and two readers. The student will have completed an acceptable thesis proposal and initiated research for the thesis.

During the supervision course the student will meet as needed with his/her thesis advisor; the advisor will be available for classroom visits as needed. The advisor and the student will call on readers and other staff members to act as a team in providing to the student the necessary consultation for completion of an acceptable thesis.

The dates for submission of the thesis to the thesis committee are as follows:
- April 1 for May graduation
- July 1 for September graduation
- November 15 for January graduation

The thesis committee, consisting of the primary advisor and two readers, will be responsible for advising the student during preparation of the thesis, for judging its acceptability, and for conducting the student's oral defense of the thesis after it has been submitted in writing.

6-10 credits

Advanced Core Courses

Philosophy (600 level) Foundations of Philosophical Thought
A systematic study of major philosophical issues, including mind-body dualism, free will and determinism, rationalism and scepticism, materialism and the problem of evil.
3 Credits

Philosophy (600 level) Ethical Theory
The main problems and theories concerning the nature, scope and justification of value judgments.
3 Credits

Philosophy (600 level) Moral Education
A systematic study of the particular questions raised by the teaching of morality; e.g., the reason-habit paradox, the question of free will, the problem of indoctrination, the question of relativism, and the role of the teacher as moral agent.
3 Credits

Psychology 650 Cognitive Psychology
A survey of the field of cognitive psychology from an information processing viewpoint. This course will consider how people encode, organize, transform and output information. Emphasis will be placed on such topics as concept formation, problem-solving, and creative thinking.
3 Credits

Psychology (600 level) Psychology of Language
Behavioral and physiological approaches to the processes underlying language and thought, and of the interrelationships between them.
3 Credits

Psychology (600 level) Research Methods
A study of descriptive and inferential statistics as it is applied in educational research.
3 Credits

English

Faculty

Ann Berthoff, MA, Radcliffe College, *17th Century Poetry, Teaching Methods, Literature Theory*

Joel Blair, PhD, Harvard University, *18th Century Literature, Satire*

Max Bluestone, PhD, Harvard University, *Elizabethan Drama, Shakespeare*

James H. Broderick, PhD, Harvard University, *19th Century Literature, Literary Criticism*

Josephine Bunselmeyer, PhD, Fordham University, *Shakespeare Linguistics*

Martha Collins, PhD, University of Iowa, *Modern Poetry, Creative Writing*

Robert Crossley, PhD, University of Virginia, *19th Century Prose, The Novel*

Linda Dittmar, PhD, Stanford University, *Modern Novel*

Albert J. Divver, PhD, University of Michigan, *19th Century Poetry, Poetics Linguistics*

Mary Anne Ferguson, PhD, Ohio State University, *Medieval Literature, Linguistics*

Philip Finkelpearl, PhD, Harvard University, *16th Century Literature, Shakespeare, Elizabethan Drama*

Edwin Gittleman, PhD, Columbia University, *Colonial and Romantic American Literature*

F. Russell Hart, PhD, Harvard University, *18th and 19th Century Literature, Teaching Methods*

Alan Helms, PhD, Rutgers University, *Modern Poetry*

Susan Horton, PhD, Brandeis University, *19th Century Literature, Stylistics*

Seymour Katz, PhD, Harvard University, *American Literature*

Richard Lyons, PhD, Princeton University, *Modern British and American Fiction, 19th Century Literature*

Emerson Marks, PhD, New York University, *19th Century Literature, Literary Criticism*

Monica McAlpine, PhD, University of Rochester, *Medieval Literature, Chaucer*

Duncan Nelson, PhD, Harvard University, *Composition*

Shaun O'Connell, PhD, University of Massachusetts, *Modern American Fiction, The Novel*

Mary Shaner, PhD, University of Illinois, *Chaucer, Old English*

George Slover, PhD, Indiana University, *Theatre History, Elizabethan Drama*

George Smith, PhD, University of Virginia, *Milton*

Irvin Stock, PhD, Columbia University, *Modern Drama*

Taylor Stoeher, PhD, University of California at Berkeley, *American Literature*

Joseph Tribble, PhD, Harvard University, *American Literature*

Frederick Willey, PhD, Harvard University, *The Novel, Literature Theory*

Admission Requirements

The English Graduate Committee will offer admission to the program to those applicants who present evidence of their ability to do graduate work with distinction. Such evidence will include:

1. a distinguished undergraduate transcript with generally at least an average of B or 3.0 in undergraduate English courses;
2. at least three encouraging and informed letters of recommendation from the applicant's undergraduate teachers (in English or related fields) or from others competent to comment on the applicant's academic qualifications;
3. a statement by the applicant (of 800 to 1200 words) of his/her major interests in the advanced study of English. While not required, the submission of Graduate Record Examination Aptitude scores (Verbal and Mathematical) is highly recommended. Writing samples are sometimes required. Undergraduate courses which fill in the student's background are sometimes required.

The Program

The English Department of the University of Massachusetts at Boston offers a coherent and flexible program of studies leading to the Master of Arts Degree in English. As vitality and variety are characteristic of English and American literature, so too are these the distinctive features of the English MA Program. Thus course offerings reflect the established range of critical approaches to literature through the study of periods, genres, major authors, criticism, language and pedagogy. While the pattern of seminar offerings reflects this variety of literary experience, further opportunities exist for independent study and choice in the form of the Final Exercise required of all English MA students. Regular offerings of a series of seminars — studies in poetry, fiction and drama; the teaching of literature and composition — are designed to fulfill a special responsibility to those who plan careers in secondary school teaching. The English MA Program is further established to serve those who plan to go on to earn a PhD, those who are interested in critical publication, and those, without defined career goals, who seek to gain a greater command of English and American literature.

Degree Requirements

Requirements for the MA degree in English include the satisfactory completion of six graduate-level courses (30 credits), the satisfaction of the foreign language requirement, and the satisfactory completion of the Final Exercise.

The six graduate-level courses may be selected from the ten graduate seminars offered each academic year. The English MA student may enroll in two advanced undergraduate courses in English or related fields at the University of Massachusetts at Boston and substitute these two courses for one of the six graduate courses required for the degree. A student wishing to transfer credits earned elsewhere may petition for evaluation of such credits; up to six (6) transfer credits may be accepted. The degree candidate must earn at least a 3.0 (B) cumulative average in courses taken for graduate credit at the University of Massachusetts at Boston. The degree candidate may propose a semester's unit of independent study including writing which, if approved, may substitute for one required semester course. All graduate courses carry five credits.

An English MA student must demonstrate a reading knowledge of one foreign language, ancient or modern. The reading knowledge may be demonstrated either by achieving a score of 575 or better on the ETS Graduate School Foreign Language Test (GSFLT administered from Princeton, NJ), or by earning an A or B in an advanced undergraduate foreign literature course (400 level) at the University of Massachusetts at Boston, or (by petition) in a course at an equivalent level elsewhere. Students who plan a career limited to secondary-school teaching, and who have no intention of later proceeding to the PhD level, may petition for the waiver of the foreign language requirement. A waiver will also be granted to students whose command of an approved language is so obvious as to make further examination of course requirement superfluous.

The **Final Exercise** is designed to provide coherence to English MA students' studies. Recognizing the diversity of backgrounds and aims of these students, the English Graduate Committee has designed the Final Exercise to contain three options. Option A asks the student to rework one of his/her papers; this option is designed to serve those who wish to learn how to produce a paper of publishable, professional quality. Option B is a three-hour written exam, based upon a list of texts agreed upon by the student and a faculty committee; this option is designed to serve those who wish to follow out their own interests in English and American literature. Option C is a three-part, three-hour exam based upon a reading list prepared by the English Graduate Committee, inviting the student to focus upon one literary period and explicate a lyric poem chosen by the committee; this option is designed to serve primarily secondary school teachers who wish to teach their subject with a sense of English and American literature as a whole.

List of Courses

Each academic year twelve English MA seminars are offered; six each semester are selected from the following course offerings:

Engl 701 Image of America
An examination of the way in which America has responded to the concept of the new world and the image of self and nation that has evolved.
5 Credits

Engl 702 The Black Presence
Study of selected literary texts of the last two hundred years by major and minor authors who wrote with a special consciousness of the significance of Black people in American society.
5 Credits

Engl 703 Regional Literature
Regional consciousness in representative works of modern American writers of the South and New England; the roles that the sense of history, the sense of place, and the response to the natural world play in the work of Southern and New England writers.
5 Credits

Engl 704 Hawthorne and James
A study of the relationship between the fiction of Hawthorne and James, focusing on James' criticism of Hawthorne.
5 Credits

Engl 705 Contemporary American Fiction
A study of the scope (times and types) and strains (types and tensions) in the post WWII, post-Modern American novel with special attention to the persistence of realism, the insistent presence of surrealism and the occasional combination of the two.
5 Credits

Engl 706 Modern American Poetry
Studies in the poetry and selected prose of Robert Frost, E.A. Robinson, Robert Lowell, and Alan Tate, with complementary readings from other Modern American Poets.
5 Credits

Engl 707 Colonial American Literature
Study of literary works written in America before there was a politically independent American nation. Not only 'representative' works, but also major texts with a significance which transcends the colonial period.
5 Credits

Engl 718 History of the English Language
Description and analysis of modern English from a linguistic perspective, attention to the relationship of linguistic analysis to literature. A survey of Old English, Middle English, early Modern and 18th century English, with its stress on traditional grammar.
5 Credits

Engl 719 Studies in Early English Drama
A study of the development of form — particularly the forms of comedy and tragedy — in the drama of Shakespeare's predecessors and contemporaries. Readings of selected mystery and morality plays and of works by such playwrights as Marlowe, Kyd, Marston, Tourneur, Webster, Greene, Dekker, Jonson, Beaumont and Fletcher. One play of each kind by Shakespeare.
5 Credits

Engl 720 Chaucer
A study of Chaucer's major works in Middle English. Special attention to such consideration as Chaucer's poetic development, his relations to his sources, medieval literary theory, and the social, political, and religious backgrounds.
5 Credits

Engl 721 Medieval to Renaissance Literature
A course in the transition from Medieval to Renaissance literature. A study of the transition in prose from nometic writings and the romances through Eliot, Ascham and Lyly, in lyric and narrative verse from Chaucer and the Scottish Chaucerians through Sidney and in drama from the morality and mystery plays through *Hamlet.*
5 Credits

Engl 723 Metaphysical Poetry
A survey of the major English poets called 'metaphysical' in their historical context: Donne, Herbert, Vaughan, Crashaw, Marvell.
5 Credits

Engl 725 Milton
A study of the poetry and major prose with particular attention to *Paradise Lost;* Milton's style, his relations to traditional literary forms, his thematic concerns; an examination of Milton criticism.
5 Credits

Engl 730 The Rise of the Novel
A literary and historical study of early experiments in the shaping of the new genre of the novel. Samples ranging from the late seventeenth century to the early nineteenth include a variety of experimental forms.
5 Credits

Engl 733 Augustan Satire
Study of the major Augustan satirists — Dryden, Swift, and Pope — with attention paid to the works of Rochester, Addison, Gay and Fielding; consideration of the critical questions arising from the study of satire.
5 Credits

Engl 741 Studies in Romanticism
The seminar will approach the unity of Romanticism through consideration of three important modes of British poetry, fiction, and criticism in the period from c. 1790 to c. 1832: the visionary (primarily Blake and Wordsworth), the picturesque (Scott and Byron), and the aesthetic (chiefly Keats, with related readings in the criticism of Hazlitt).
5 Credits

Engl 742 American Romanticism
A study of critical conceptions of American Romanticism. Readings will include examples of critical writing and fiction by Brown, Irving, Cooper, Poe, Simms, Hawthorne and Melville, and poetry by Bryant, Poe, Longfellow, Lowell, Emerson and Whitman.
5 Credits

Engl 746 Victorian Literature
Aestheticism and socialism in Victorian literature. The subject of the course is the development of two issues in the work of some major Victorian writers: the movement away from the classical view that art is normative to an increasing acceptance of the view that art is autotelic, and an accompanying movement away from a special concern with art to a concentration on social reform.
5 Credits

Engl 751 Modern Poetry
A study of the major figures and currents in modern British and American poetry.
5 Credits

Engl 752 Modern British Fiction — Lawrence and Woolf
A comparison of the major novels of D.H. Lawrence and Virginia Woolf, with particular attention paid to the two writers' conceptions of the nature and function of the novel and to their relation to the literary contexts of the period, 1914-1940.
5 Credits

Engl 760 Studies in Poetry
Studies in the nature of poetry and an examination of modes. A reading of representative English and American poetry.
5 Credits

Engl 761 Studies in the Novel
Studies in the nature of prose fiction and the major kinds of novels. A reading of representative novels in English and American literature.
5 Credits

Engl 762 Studies in Drama
A study in English and American drama from an awareness of its European contexts. Plays discussed will come from the major periods of western drama and will provide examples of the major kinds of drama.
5 Credits

Engl 763 Studies in Satire
An exploration of individual works of satire and critical theories about the mode; premodern and modern selections from Swift, Pope, Shaw, Waugh, F. O'Connor, N. West, Eliot and others.
5 Credits

Engl 764 Nature of Narrative
This course explores a variety of ways in which modern and contemporary fiction, both English and European, departs from traditional narrative forms. While a comparative study of experimentation will be the main concern, philosophical, political, and psychological issues as they affect narrative form in the twentieth century may also be addressed.
5 Credits

Engl 767 Shakespeare
Shakespeare's idea of dramatic art as revealed in explorations of one of the following topics — the plays and their sources, theatrical self-consciousness, Shakespeare's language of the theater.
5 Credits

Engl 768 Arnold and Eliot
The study of two important men of letters who reflected and criticized the main artistic and intellectual currents of their time. Readings from their poetry, literary criticism, and social commentary as well as selected writings contemporary with each author.
5 Credits

Engl 771 Faulkner
A reading of all the major fiction centered in Yoknapatawpha County, with an intensive study of selected texts.
5 Credits

Engl 775 Stylistics
A study of the connection between linguistics and literature. An effort in turning linguistic information into strategies useful for interpreting novels, for describing how novels and poems get put together, for helping us learn how meaning gets made in a literary text, for talking about how a reader's responses to a text get generated out of the particular stylistic/linguistic choices a writer makes.

5 Credits

Engl 776 Studies in Criticism
Study of the nature and function of literature, the terms and methods of analysis and evaluation of literature, and the various approaches possible in the criticism of literature.

5 Credits

Engl 777 Teaching of Literature
Theories and practice of the teaching of literature considered in the context of current models of the liberal arts college and of current issues in humanities curricula.

5 Credits

Engl 778 Problems in Modern Criticism
An introduction to some important modern critics: T.S. Eliot, I.A. Richards, Northrop Frye, Harold Bloom, Freud, D.H. Lawrence, Kenneth Burke, George Lukacs, Walter Benjamin, Sartre, Raymond Williams, and perhaps Blanchard, Blanchot or Derrida. The emphasis will be on some problems these critics face defining their function, choosing a method, adopting an epistemology, and setting formal aims. Consideration of how the three 'schools' these critics represent (the Aesthetic, the Synthetic, and the Radical) offer varying solutions to these problems.

5 Credits

Engl 786 Literature and Society — 19th Century England
A study of literature with special reference to its social and historical circumstances and of the theoretical questions raised by such a perspective. Authors to be studied include Austin, Cobbett, Gaskell, Dickens, Engels, Charlotte Bronte and Lawrence.

5 Credits

Engl 789 Teaching of Prose Fiction
This course will focus narrowly on the problems of teaching fiction to teenagers — why one approach works and another does not — with emphasis on the practical rather than theoretical. The course begins with members sharing the experiences encountered in their own classrooms, and proceeds through the examination of standard texts — novels like *Huckleberry Finn* or *Great Expectations,* and short stories as well. Larger issues such as the relevance of literature to the lives of young students, the place of fiction in our culture, etc., will also be considered.

5 Credits

Engl 791 Teaching of Composition
The attempt will be to define the role of composition in the English curriculum in both college and secondary schools; to develop a philosophy of language as a foundation for a method of composing; to study psychological and linguistic aspects of the composing process.

5 Credits

Engl 792 Introduction to Linguistics
The course will first raise large questions behind the study of linguistics: What is the relationship between language and thought? Then the course will survey the application of linguistics to the study of literature, the analysis and teaching of syntax and grammar, and the fields of psychology, sociology and biology.

5 Credits

Engl 793 The Reading and Teaching of Poetry
Designed for graduate students who want an advanced introductory course, or a refresher course, in the reading and comprehension of poetry, perhaps with the object of teaching it to younger minds. Emphasis on practical criticism, or close reading, but various perspectives and critical approaches are included, along with teaching aids and pedagogical exercises. Concentration on poets of the 19th and 20th centuries, such as Blake, Keats, Hopkins, Dickinson, Yeats, Frost and Lowell.

5 Credits

Engl 795 Teaching of Fantasy and Science Fiction
The seminar will examine major works of unrealistic fiction and some important critical and theoretical approaches to it as a way of raising, defining, maybe even answering some questions about the teaching of literature. The seminar will be useful for two main groups of students: those who want to explore in some detail the problems of how to read and talk about science fiction and fantasy in a sophisticated, thoughtful way, and those now engaged in or soon-to-be engaged in high school teaching who are interested in how to develop appropriate curricula and pedagogies in response to student interests in non-realistic narrative.

5 Credits

Engl 800 Independent Study
A comprehensive study of a particular area of literature, a particular author, etc. Consultation with the Graduate Program Director is mandatory. Applications or outlines of study must be submitted at the end of the semester previous to the study. Approval by the graduate committee is required.

5 Credits

History

Faculty

Feroz Ahmad, PhD, University of London, *Middle Eastern History*

Hatim Amiji, MA, Princeton University, *African History*

Edward Berkowitz, PhD, Northwestern University, *20th Century American History*

Paul Bookbinder, PhD, Brandeis University, *German History*

Francis L. Broderick, PhD, Harvard University, *American Social and Intellectual History since 1865*

Thomas N. Brown, PhD, Harvard University, *20th Century American and Immigration History*

Michael Chesson, PhD, Harvard University, *American Civil War and Reconstruction*

Jonathan Chu, PhD, University of Washington, *American Colonial History*

Spencer DiScala, PhD, Columbia University, *Modern Italian History*

Paul Faler, PhD, University of Wisconsin, *American Labor and Social History*

Clive Foss, PhD, Harvard University, *Ancient History*

Paul A. Gagnon, PhD, Harvard University, *Contemporary French History*

Linda Gordon, PhD, Yale University, *Women's History*

Walter Grossmann, PhD, Harvard University, *18th Century European History*

Robert E. Hannigan, MA, Princeton University, *American Diplomatic History*

David Hunt, PhD, Harvard University, *French Revolution*

Esther Kingston-Mann, PhD, John Hopkins University, *Russian History*

Timothy McCarthy, PhD, Brandeis University, *European Intellectual History*

Frances Malino, PhD, Brandeis University, *Middle Eastern and Jewish History*

William A. Percy, PhD, Princeton University, *Medieval History*

Richard H. Powers, PhD, Ohio State University, *Modern European History*

Roger W. Prouty, PhD, Columbia University, *Modern Britain, British Empire,* and *History of Boston*

Eric H. Robinson, MA, Cambridge University, *Economic History* and *History of Technology*

Susan C. Schneider, PhD, University of Texas, *Latin American History*

Lester A. Segal, PhD, Columbia University, *Early Modern French* and *Jewish History*

Marshall S. Shatz, PhD, Columbia University, *Russian History*

Malcolm R. Smuts, PhD, Princeton University, *Tudor-Stuart England*

James C. Turner, PhD, Harvard University, *American Intellectual History*

Renee Watkins, PhD, Harvard University, *Renaissance and Reformation*

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R. Nicholas Olsberg, PhD, University of South Carolina, *Coordinator of the Archives Program*

Admission Requirements

Applicants must submit evidence that they are able to perform graduate work at a high level of competence. This will include:

1. The applicants' undergraduate transcripts and the transcripts of any graduate work already completed.
2. Three letters of recommendation from teachers or others acquainted with their talents and professional achievements.
3. Graduate Record Examination scores if available.

Applicants will normally be expected to have maintained a 3.0 (B) cumulative average in history courses as undergraduates. Applications from persons who did not major in history as undergraduates will be considered but such persons, if admitted, may be asked to pursue a program of reading or course work designed to remedy any deficiencies in their preparation for graduate study.

Programs

The History Department offers two programs: The Master of Arts Program in History and The Master of Arts Program in History and Archival Methods.

A Master of Arts Program in Historical Archaeology will be implemented in cooperation with the Anthropology Department in September 1980.

History:
The Master of Arts Program in History offers a rigorous, individually-planned set of courses and supervised research and writing. Both demanding and flexible, it suits those students who intend to pursue a PhD as well as those who seek to test their capacity for graduate work before committing themselves. Not all students enter directly from college; many return at the beginning graduate level after long absences from school. The student body includes teachers at the secondary level who desire to improve their knowledge of the field. Those students who simply wish to pursue advanced studies for their own intellectual enjoyment and development also benefit from the program's design. Graduate enrollment is small, affording the graduate student close faculty attention and support.

History and Archival Methods:
The Master of Arts Program in History and Archival Methods combines graduate study in history with training in archives and manuscripts administration. The program prepares students for careers as archivists in the public or private sector. It is of special appeal to librarians and museum staff members who wish to develop archival skills.

Degree Requirements

Requirements for both programs are 30 credit hours. All students are required to take the graduate colloquium on historical methodology (4 credits) and five additional approved courses (20 credits). For students in the History and Archival Methods Program, those additional courses include two required archival methods courses and a research seminar in American history.

Students in the History Program complete a Master of Arts thesis (6 credits). For students in the History and Archival Methods Program there is an Archival Practicum (6 credits) which is in lieu of the Master of Arts thesis.

Students must also demonstrate a reading proficiency in one foreign language — French, German, Spanish, or another judged relevant to the student's major area of interest. This requirement may be met by performing satisfactorily on the ETS Graduate School Foreign Language Test, or by passing a test administered by the program.

Students may choose to enroll in the program either full or part time. In normal circumstances it is expected that all requirements for the degree will be completed by full-time students within three years of each student's first enrollment and within four years by part-time students.

Before candidates are approved for the Master of Arts degree, they must be examined orally on the thesis or practicum and on the fields of history in which it falls. The examining committee consists of the student's thesis/practicum supervisor and two additional readers (one of whom may be from outside the History Graduate Program) to be chosen by consultation among the supervisor, the students, and the Associate Provost for Graduate Studies. To pass these examinations, students must receive at least two affirmative votes. If they fail, they may repeat the examination two times at intervals of not less than three months. If the examination has not been passed within two calendar years from the date upon which the examination was first taken, the student will be removed from degree candidacy, and will be readmitted only through a special petition to the Graduate Committee.

No grade below 'B-' awarded to a graduate student will count toward fulfilling the requirements for a Master of Arts Degree in History or History and Archival Methods.

600-Level courses (except 698 and 699) are open to graduate and undergraduate students. Courses above the 600 level are open to graduate students only.

List of Courses

Hist 610 American Historical Tradition
Mr. Hannigan
This course will explore the major schools of American historical interpretation and study the historical controversies that surround major developments in the history of the United States. Among the many historians to be discussed are Bancroft, Turner, Beard, Hofstadter, and Williams.
2 Lect Hrs 4 Credits

Hist 615 European Historical Tradition
Mr. Powers
The history of European historical writing from Voltaire to Toynbee, with emphasis on the historians of the nineteenth century.
2 Lect Hrs 4 Credits

Hist 620 Biography
Mr. Shatz
The art and craft of biographical writing. The course will examine a variety of approaches to biography, e.g., psychobiography, literary biography, political biography. Representative examples of each of these approaches will be analyzed. Particular attention will be paid to the retrieval and critical use of biographical materials, such as autobiography, archives, oral sources.
2 Lect Hrs 4 Credits

Hist 640 England, America and Revolution
Mr. Smuts and Mr. Chu
This course will examine the nature of politics and political practice in both the colonies and Great Britain during the eighteenth century. The major focus of the course will be the ways in which distinctive English and American political cultures emerged out of a common tradition.
2 Lect Hrs 4 Credits

Hist 645 History and Social Theory
Mr. McCarthy
This course examines the relations between history and social theory as exemplified in two major traditions of nineteenth-century thought — conservative and liberal. Among the figures to be discussed are Burke, DeMaistre, de Tocqueville, Mill and J.F. Stephen.
2 Lect Hrs 4 Credits

Hist 680 Topics in the History of Charlestown
Mr. Brown
A seminar on selected topics in the development of Charlestown, a Boston neighborhood, from the late eighteenth century to the present.
2 Lect Hrs 4 Credits

Hist 698 Field Practicum in Archival Methods
Mr. Olsberg
All archives and manuscripts specialists will intern up to 8 hours per week in one of the participating institutions; arrangements can be made for students expressing interest in a field (such as church archives or local records) not represented by the participants to work in an appropriate repository. Intern projects will be designed to be completed within the semester and all projects will result in written surveys, finding aids, or preliminary inventories, comparable in extent of effort to a master's thesis. The internship and resulting written work will be the equivalent of a 6-credit thesis research and preparation.
Hrs by arrangement 6 Credits

Hist 699 Master of Arts Thesis
Staff
Under the supervision of the appointed advisor. All topics must be previously approved by the program's graduate committee. The thesis will be judged for its suitability as partial fulfillment of the requirements for a Master of Arts degree by the appointed advisor and two additional readers selected in consultation with the Associate Provost for Graduate Studies.
Hrs by arrangement 6 Credits

Hist 700 Graduate Colloquium
Ms. Malino
An advanced course in historical methodology. Topics to be covered will include historiography, the analysis of argument and evidence, recent developments in historical methods. Required of all graduate students.
Prerequisite: Graduate standing.
2 Lect Hrs 4 Credits

Hist 701 Topics in European History
Staff
Examinations of important themes in European political and social, cultural and intellectual history. Topics will vary.
Prerequisite: Graduate standing.
2 Lect Hrs 4 Credits

Hist 702 Topics in American History
Staff
Examinations of important themes in American political and social, cultural and intellectual history. Topics will vary.
Prerequisite: Graduate standing.
2 Lect Hrs 4 Credits

Hist 710 Research Seminar in European History
Staff
An advanced course in historical research. Readings and research will draw upon historical materials in European history and will concern topics to be announced in advance.
Prerequisite: Graduate standing.
2 Lect Hrs 4 Credits

Hist 711 Research Seminar in American History
Staff
An advanced course in historical research. Readings and research will draw upon diverse historical materials, primary sources, records, and documents in American history, and will focus upon topics to be announced in advance. Required of students in the Archival Methods Program.
Prerequisite: Graduate standing.
2 Lect Hrs 4 Credits

Hist 720 Introduction to Archival Methods
Mr. Olsberg and participating archivists in the Boston area
An introduction to archives with instruction in the techniques of collection, survey, description, appraisal and arrangement of manuscripts and records. Eight classes will be taught and students will be asked to participate in four working field trips to local repositories. The course is seen both as basic instruction in archival principles and practice for potential users. Theoretical readings will be limited, and the emphasis will be on practical exercises in the arrangement, description, survey and appraisal of records.
Prerequisite: Graduate standing.
2 Lect Hrs 4 Credits

Hist 721 Internship in Archival Methods
Mr. Olsberg and participating archivists in the Boston area
Guest lecturers will address advanced problems in archives: copyright, access, privacy, and custody; professional ethics, sampling techniques; provenance and function; automated retrieval systems; paper conservation; etc. Students will be required to prepare one seminar paper or lecture on a subject growing out of their internship experience. Required for archives specialists. Only those interning in a repository will be eligible.
Prerequisite: Graduate standing.
2 Lect Hrs 4 Credits

Hist 750 Independent Study I
Staff
Advanced course of independent readings, under the guidance, and subject to the examination, of the instructor. Areas and topics according to student need.
Prerequisite: Graduate standing.
Hrs by arrangement 4 Credits

Hist 751 Independent Study II
Staff
Advanced course of independent readings, under the guidance, and subject to the examination, of the instructor. Areas and topics according to student need.
Prerequisite: Graduate standing.
Hrs by arrangement 4 Credits

Mathematics

Faculty

Bernice Auslander, PhD, University of Michigan, *Commutative Ring Theory*

Alfonso Azpeitia, PhD, University of Madrid, *Complex Analysis and Mathematical Programming*

Ethan Bolker, PhD, Harvard University, *Combinatorial Analysis*

James S. Byrnes, PhD, Yeshiva University, *Analysis*

Daniel Comenetz, PhD, Brandeis University, *Algebraic Geometry*

Erness Elyash, PhD, Cornell University, *Probability*

Mathew Gaffney, PhD, University of Chicago, *Differential Geometry*

Colin Godfrey, PhD, Harvard University, *Algebra*

Guy Hogan, PhD, Ohio State University, *Group Theory*

Herbert Kamowitz, PhD, Brown University, *Functional Analysis*

Joan Lukas, PhD, Massachusetts Institute of Technology, *Theory of Computations and Mathematical Logic*

John A. Lutts, PhD, University of Pennsylvania, *Topology and History of Mathematics*

Robert A. Morris, PhD, Cornell University, *Algebra and Computer Science*

Some Nath Mukherjee, PhD, BH University (India), *Functional Analysis and Transform Calculus*

Kenneth Newman, PhD, Cornell University, *Algebra and Computer Mathematics*

Elizabeth O'Neil, PhD, Harvard University, *Applied Mathematics*

Stephen K. Parrott, PhD, University of Michigan, *Functional Analysis*

James Perchik, PhD, Harvard University, *Topology and Computer Mathematics*

Geza Schay, PhD, Princeton University, *Probability*

Robert Seeley, PhD, Massachusetts Institute of Technology, *Partial Differential Equations*

Taffee T. Tanimoto, PhD, University of Pittsburgh, *Geometry*

Michael B. Tomlinson, PhD, University of Oregon, *Functional Analysis*

Dennis M. Wortman, PhD, Massachusetts Institute of Technology, *Functional Analysis*

Admission Requirements

At least 18 semester credit hours in undergraduate mathematics beyond the content of Differential and Integral Calculus are normally required of each candidate entering the master's program. A one-year course in Advanced Calculus and a one-year course in Linear Algebra are desirable.

The Program

The University of Massachusetts at Boston provides low-cost, high-quality postgraduate training in mathematics for a wide variety of students, full and part time. In order to maximize the accessibility of the program all graduate courses are scheduled in the late afternoon and evening.

While the program offers the opportunity for advancement in mathematical knowledge to all qualified students, it has three major objectives:

a To prepare students for graduate work in pure mathematics at the doctoral level.

b To provide the professional qualifications needed for teaching mathematics up to the two-year college level. In this connection, the opportunity is available for students to combine graduate courses in mathematics with the existing Teacher Certification Program.

c To offer the opportunity for professional advancement to teachers already in service.

Degree Requirements

To earn a Master's Degree in Mathematics, a student must:

1. Pass ten courses (30 credits) at least six of which must be numbered 700 or above, and which must include the courses 711 (Modern Algebra I), 721 (Complex Variable I), 723 (Real Variable I), and 725 (Topology I) or their equivalent. Math 701 (Advanced Linear Algebra) or its equivalent will be a requirement for students having less than one year of Linear Algebra. No more than three of the ten courses counted toward the master's degree may be taken outside the program. They must be graduate courses and two must be related to mathematics. With the approval of the graduate program, three credits, substituting for one of the elective courses, may be earned by participating in a Graduate Seminar which will involve independent reading and expository work both oral and written.
2. Pass the Master's Written Qualifying Exam. This exam consists of two parts, each of which lasts four hours; one part covering algebra and topology, and the other, analysis. Knowledge of the material through the level of 711, 721, 723, and 725 should be sufficient to enable the student to pass the exam.

List of Courses

Math 701 Advanced Linear Algebra
Linear and multi-linear algebra. Linear transformations. Spectral theory. Canonical forms. Dual spaces. Tensor products. Exterior algebra.
Prerequisite: Math 261 or permission of instructor.
3 Credits

Math 711, 712 Introduction to Modern Algebra I and II
Groups, rings, algebras, fields, modules. Tensor products. Homological algebra.
Prerequisite: Math 360 or permission of instructor.
3 Credits

Math 721, 722 Theory of Functions of a Complex Variable I and II
Linear transformations of a complex variable. Power series and elementary functions. Holomorphic functions and Cauchy's Theorem. Theory of residues. Isolated singularities. Conformal mappings. Entire and meromorphic functions and their representations by means of products and partial fractions. Elliptic functions. Analytic continuation and Riemann surfaces. Algebraic functions.
Prerequisite: Math 450 and 475 or permission of instructor.
3 Credits

Math 723, 724 Theory of Functions of a Real Variable I and II
The real number system. Lebesgue measure and the Lebesgue integral. Differentiation. The classical Banach Spaces, general measure, and integration theory.
Prerequisite: Math 450 or permission of instructor.
3 Credits

Math 725, 726 Topology I and II
Topological spaces, classification, separation properties, cartesian products, mappings and continuity, connectedness, general convergence, compactness, function spaces, introduction to homotopy theory. Algebraic topology.
Prerequisite: Math 450 or permission of instructor.
3 Credits

Math 727, 728 Differentiable Manifolds I and II
Topics to be selected from:
Differentiable manifolds, tangent spaces, tangent bundles, flows and vector fields. Lie derivatives, differential forms, generalizations of line and surface integrals. Divergence theorem and Stokes' theorem. Riemannian manifolds, Riemann surfaces. Relationships to vector analysis and to differential geometry.
Prerequisite: Math 321, 475 and 665 or permission of instructor.

3 Credits

Math 729 Stochastic Processes I
Probability spaces, measures, random variables, various modes of convergence, laws of large numbers and of the iterated algorithm. Central limit theorem conditioning martingales.
Prerequisite: Math 723 or permission of instructor.

3 Credits

Math 730 Stochastic Processes II
Processes with independent increments. Markov chains, stationary processes, continuous parameter, Markov chains, diffusion processes, sample paths, separability, semigroups, boundaries.
Prerequisite: Math 729 or permission of instructor.

3 Credits

Math 731 Partial Differential Equations I
Hamilton-Jacobi Theory for equations of first order distributions. Fourier integrals of distributions. Sobolev spaces of distributions.
Prerequisite: Math 310, 321, and 450 or permission of instructor.

3 Credits

Math 732 Partial Differential Equations II
Elliptic equations, Garding's inequality, smoothness of solutions, solutions of the Dirichlet problem, hyperbolic equations, the Cauchy problem.
Prerequisite: Math 731 or permission of instructor.

3 Credits

Math 789, 790 Special Topics I and II

Applied Physics

Faculty

Marvin M. Antonoff, PhD, Cornell University, *Theoretical Solid State Physics*

Leonard A. Catz, PhD, Hebrew University of Jerusalem, *Experimental Atomic and Nuclear Spectroscopy*

Edward S. Ginsberg, PhD, Stanford University, *Theoretical Elementary Particle Physics*

Donald H. Lyons, PhD, University of Pennsylvania, *Theoretical Solid State Physics*

Harold P. Mahon, PhD, University of Washington, *Energy Concerns and Experimental Magnetic Resonance*

Arthur W. Martin, PhD, Stanford University, *Theoretical Elementary Particle Physics*

Benjamin R. Mollow, PhD, Harvard University, *Theoretical Quantum Optics*

Martin Posner, PhD, Princeton University, *Biophysics, Cell Physiologic and Molecular Studies*

D.V.G.L.N. Rao, DSc, Andhra University of India, *Experimental Laser Research, Nonlinear Optics*

Freda Salzman, PhD, University of Illinois, *Theoretical Research in General Relativity*

George Salzman, PhD, University of Illinois, *Theoretical Research in General Relativity, Science for Humane Survival*

Nareshchandra P. Shah, PhD, Stanford University, *Experimental Low Temperature Physics, Positron Annihilation*

John R. Shane, PhD, Massachusetts Institute of Technology, *Experimental and Theoretical Solid State Physics*

Admission Requirements

An applicant for admission to the Graduate Program in Applied Physics should present adequate evidence of his/her preparation and ability to do graduate work. Normally a bachelor's degree with a major in physics is required, though in certain instances other, equivalent preparation may be acceptable. For applicants now or recently in college, the three letters of recommendation should come from professors in the field of physics or in closely related fields. For applicants who have been working in scientific research laboratories for several years it may be more valuable to have one or more of the letters from a senior scientist in the laboratory who is familiar with the applicant's work. It is also recommended, but not required, that an applicant plan a visit to the Department for informal contacts with the faculty and to become acquainted with the research facilities.

The Program and Facilities

The Applied Physics Program is intended primarily to prepare students for rewarding technological careers in industrial and government research laboratories, although it also provides strong preparation for subsequent training at the doctoral level. The program emphasizes the development of practical laboratory skills, through broad experience in experimental coursework, and the mastery of the fundamental areas of theoretical physics at the level appropriate to the master's degree. Auxiliary skills in computer programming will also be developed. The program maintains a close interaction with industrial and government research laboratories in the greater Boston area.

Following the initial year of coursework, qualified students may opt for an internship placement in an industrial research laboratory in the area. These paying positions provide further training and useful job experience in preparation for a technological career. Students who choose not to participate in an internship may complete the requirements for the master's degree through a supervised thesis project in the research laboratory of a member of the faculty.

The Physics Department is located in the large and well-equipped Science Building at the Harbor Campus. Facilities include ample teaching and research laboratories, a science library, computing facilities, electronics and machine shops.

Research laboratories include:

- ultrasonic spin resonance
- low temperature studies
- quantum electronics
- nuclear spectroscopy
- millimeter-wave magnetic resonance
- biophysics

Degree Requirements

Thirty credits are required for the Master's Degree in Applied Physics, apportioned as follows: four one-semester laboratory courses, four one-semester theoretical courses, totalling, at 3 credits each, 24 credits, and either an internship at an off-campus research laboratory or an on-campus thesis project, either of which, when successfully completed, earns 6 credits.

List of Courses

Phys 601 Electronic Instrumentation
A lecture and laboratory course to provide a working understanding of modern electronics and instrumentation. Topics include semiconductor devices, input transducers, operational amplifiers, non-linear devices, digital electronics, microprocessors. Selected topics, which may vary from year to year according to the interests of the staff and recent developments in technology, will stress practical instrumentation for physical measurement and control, and large scale integrated circuit digital processing techniques.
Prerequisite: Permission of instructor.
2 Lect Hrs, 4 Lab Hrs 3 Credits

Phys 602 Laser Optics Laboratory
A lecture and laboratory course to provide a working understanding of modern optics, lasers and applications. Topics include optical resonators, solid state, gas and semiconductor lasers, tunable dye lasers, nonlinear optics and spectroscopy applications. Selected topics, which may vary from year to year according to the interests of the staff and recent developments in technology, will stress practical instrumentation as well as relevant theory.
Prerequisite: Permission of instructor.
2 Lect Hrs, 4 Lab Hrs 3 Credits

Phys 603 Nuclear Radiation Physics and Biophysics Laboratory
A laboratory-based course to illustrate the theory and experimental techniques utilized in nuclear radiation physics and biophysics. Topics include modes of production of nuclear radiation (charged particles, electromagnetic, neutrons), interaction of radiation with matter (including biological tissue), instruments and techniques for radiation detection and spectroscopy, radiation protection and safety, and the use of radioisotopes in physical, chemical and biomedical research. Selected topics may include: neutron activation analysis, X-ray fluorescence, the Mossbauer effect, radioimmunoassay techniques utilizing radioisotopes, computer assisted tomography (CAT), and experiments on the interaction of radiation with tumor cells.
Prerequisite: Permission of instructor.
2 Lect Hrs, 4 Lab Hrs 3 Credits

Phys 604 Cryogenics and Vacuum Technology
A lecture and laboratory course to provide a working understanding of modern practice in cryogenics and vacuum technology. Topics include low temperature properties of materials, gas purification, separation and liquification systems, instrumentation for measurement of temperatures and pressure and vacuum technology. Selected topics which may vary from year to year acording to the interests of staff and recent developments in technology, will stress practical instrumentation and applications.
Prerequisite: Permission of instructor.
2 Lect Hrs, 4 Lab Hrs 3 Credits

Phys 605 Energy Laboratory
A lecture and laboratory course focusing on small scale technology and methods for improving the efficiency of energy use. Topics representing current activities of the staff, and student interests, may include: methods for passive and active solar collection, computer based instrumentation techniques, energy auditing of industrial processes, alternative techniques for saving energy in residential buildings, and computer modeling of building energy performance and the effect of parametric modifications to the envelope, HVAC and other energy systems of commercial buildings.
Prerequisite: Permission of instructor.
2 Lect Hrs, 4 Lab Hrs 3 Credits

Phys 611 Theory of Classical Mechanics and Fluid Mechanics
Principles of classical mechanics. Generalized coordinates, Lagrangian and Hamiltonian formulations, variational principles, multiple periodic systems, continuous media, fluid mechanics.
Prerequisite: Permission of instructor.
3 Lect Hrs, 1 Disc Hr 3 Credits

Phys 612 Electromagnetic Theory
A lecture course to develop electromagnetic theory and to treat various applications. Topics include Maxwell's equations in vacuum and in material media, electromagnetic theory of continuous media, reflection, refraction, diffraction and radiation of electromagnetic waves. Applications will be selected from such topics as wave guides and resonant cavities, and magnetohydrodynamics and plasma physics.
Prerequisite: Permission of instructor.
3 Lect Hrs, 1 Disc Hr 3 Credits

Phys 613 Quantum Mechanics, Atomic and Molecular Physics
A lecture course on the fundamental principles and applications of the quantum theory of matter. Topics include bound systems (potential well harmonic oscillator, hydrogen atom), angular momentum, spin, identical particles, the periodic table, exchange forces, chemical bonding, linear vector spaces, perturbation theory. Other topics, e.g., magnetic resonance, symmetry groups, elementary particles, will be selected according to student and faculty interests.
Prerequisite: Permission of instructor.
3 Lect Hrs, 1 Disc Hr 3 Credits

Phys 614 Thermodynamics and Statistical Mechanics
A lecture course on the principles of thermodynamics and statistical mechanics. Topics include: fundamentals of thermodynamics, first and second laws, thermodynamic potentials, phase transitions, classical kinetic theory, classical statistical mechanics, and quantum statistical mechanics. Applications of the principles will be made to physical, chemical, and biological systems of special or current interest.
Prerequisite: Permission of instructor.
3 Lect Hrs, 1 Disc Hr 3 Credits

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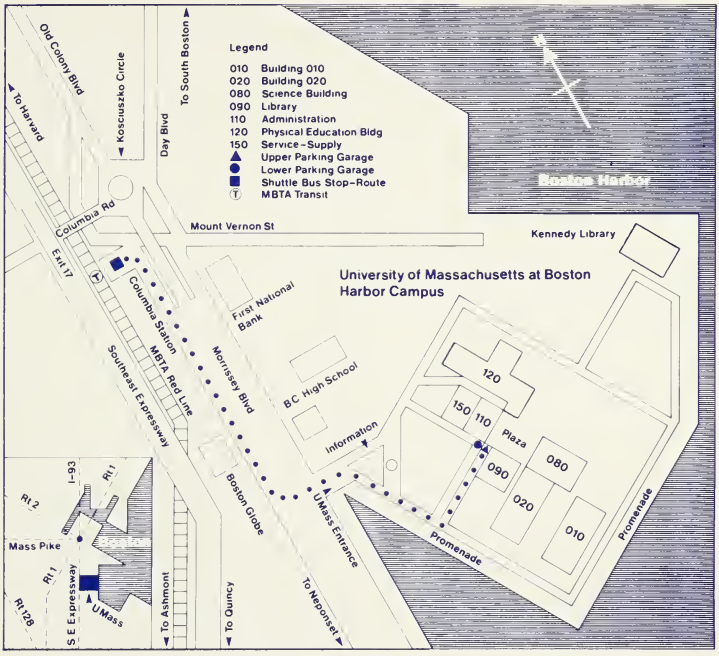
HARBOR CAMPUS MAP



HARBOR CAMPUS College of Arts and Sciences, College of Management and Professional Studies

UMass/Boston Harbor Campus is only 3 miles from downtown Boston and easily accessible by public or private transportation.

From North or West Take Southeast Expressway and leave at Exit 17. Turn left onto Columbia Road, enter rotary and take first right down ramp to Morrissey Boulevard. Bear right of island following UMass/Boston sign, turn left into campus at first traffic lights.

From South Take Southeast Expressway and leave at Exit 18 near BostonGas tanks (Morrissey Boulevard/UMass).

Public Transportation Take MBTA Ashmont Red Line to Columbia Station. Transfer to free University shuttlebus at T parking lot.

Parking Indoor space is available for 1700 cars.

DOWNTOWN CENTER College of Public and Community Service

The Downtown Center is located at 100 Arlington Street in Park Square, one block from MBTA Green Line Arlington Station. Free shuttlebus also runs between Harbor and Downtown campuses.

University of Massachusetts
at Boston
Harbor Campus
Boston, Massachusetts 02125

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